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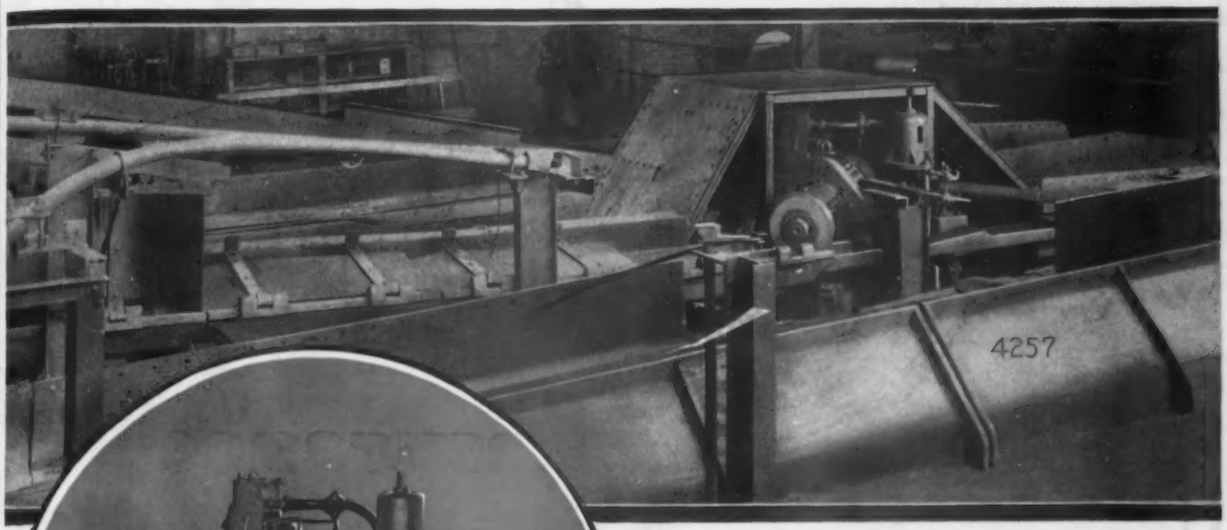

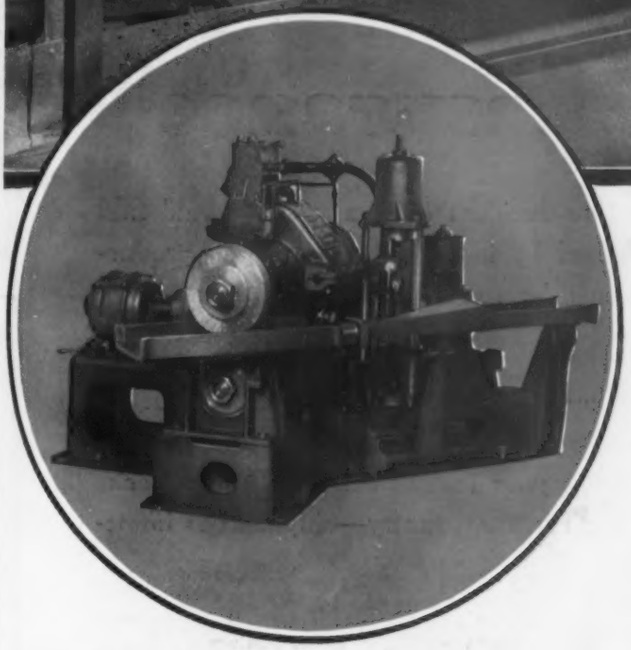

Closeup view of shear used in above installation. The bars from the mill come to the shear thru the swinging trough at the right

Appearance of half-inch round and a ¼" x 1¼" flat after being cut

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1924

THE IRON AGE

New York, May 1, 1924

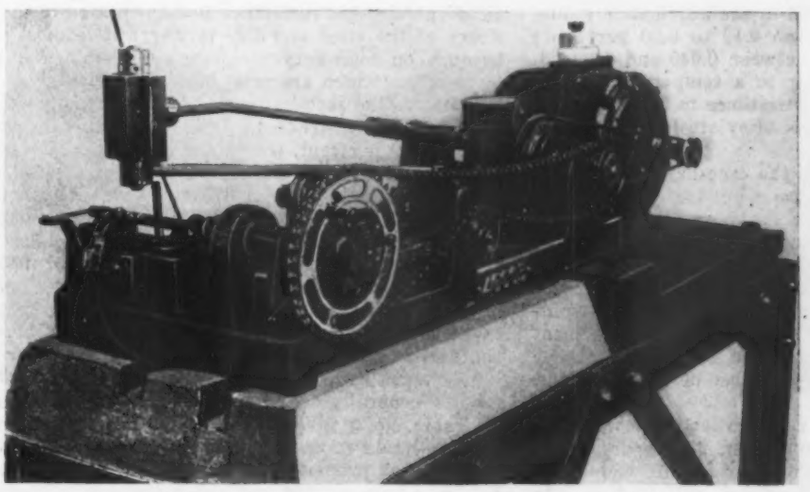
ESTABLISHED 1855 VOL. 113, No. 18

Case-Hardening and Fatigue Resistance

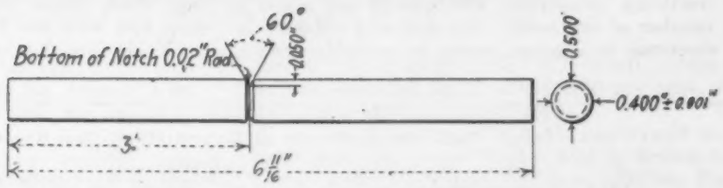
Small Parts on Treatment Found Superior to Alloy Steels for Automobiles—Comparative Tests on Various Steels Confirmed by Actual Results

BY JOHN MILLER*

REFERENCES to some tests described in a paper by the present writer a few years ago are found in an article in THE IRON AGE, March 6, by A. A. Blue entitled "An Occurrence of Grain Growth in Steel." In this paper, attention was called to the remarkable resistance of case-hardened steels to progressive failure under repeated stress, commonly called fatigue. The few tests made by Mr. Blue on case-hardened steel appear to have been in the nature of rather severe bending strains and it is well known that case-hardened steel is not adapted for such. Under an overload, the case cracks and complete fracture can proceed readily.



The Stanton Testing Machine which Was Used in Determining the Fatigue Resistance of the Various Case-Hardened and Alloy Steels Discussed in This Article



Details of the Test Piece Used in the Stanton Fatigue Testing Machine

The case-hardening process is widely used for some of the most important and highly stressed parts of motor cars, trucks, locomotives and machine tools. In many cases failure of these parts, for instance on the steering gear and connections, would be disastrous. In examining parts of this description, the writer has observed that fatigue failure due to repeated stresses is comparatively rare in properly case-hardened objects. In order to get some information regarding the relative resistance to severe localized stress between case-hardened steel and steel heat-treated in the usual way, some hundreds of tests were made on a Stanton impact fatigue testing machine in the laboratory of the Pierce-Arrow Motor Car Co. The results are described below:

The Stanton machine has been used by several manufacturers who require steel which must possess great resistance to breakdown by fatigue. They have found that a steel which passes a certain figure on this test will usually give a good account of itself in actual service. The test piece used is 6½ in. long and ½ in. in diameter. It has a V groove 0.05 in. deep turned midway between the supports, which are 4½ in. apart. The

*Metallurgist Pierce Arrow Motor Car Co., Buffalo.

Table No. 1—Results on Various Steels, Not Case-Hardened

Test No.	Kind of Steel and Treatment	Hardness		Number of Blows	
		Brinell	Sclero	2-In. Fall	1-In. Fall
1.	Screw stock, 0.18 per cent carbon cold rolled ½ in.	170	30	1,602	6,546
2.	Screw stock—1300° F. cooled in air	116	20	975	4,110
3.	Screw stock, 1500° F. cooled in water	...	38	3,110	....
4.	0.45 per cent carbon—2½ in. dia. treated	228	38	2,918	....
5.	0.35 per cent carbon—axle tubing not treated	166	27	815*	....
6.	0.35 per cent carbon, ½ test piece—1550 oil, 900 draw	223	37	4,236	....
7.	0.35 per cent, ½ test piece—1550 water, 900 draw	364	55	10,719	....
8.	1 per cent carbon drill rod—1420 water, 500 draw	555	75	617	....
9.	0.20 per cent carbon—3½ per cent nickel cold, rolled ½ in.	207	36	3,255	....
10.	0.20 per cent carbon—1100° F., cooled in air	202	33	3,620	14,252
11.	0.20 per cent carbon—1500° F., cooled in oil	402	..	10,676	43,212
12.	0.30 per cent carbon—3½ per cent nickel—1575 water—900 draw.	311	48	6,203	....
13.	Ni-Cr. S. A. E. 3325—1500 oil—1050 water	302	47	8,360	....
14.	Ni-Cr. S. A. E. 3325—1500 air	477	65	10,361	....
15.	Ni-Cr. very slowly cooled from 1150	255	41	563†	....
16.	Ni-Cr. S. A. E.—3450—1450 oil—500 air	555	78	1,616	....
17.	C-Va. No. 6125—1650 oil—800 air	364	..	10,631	....
18.	Cr-Mo—1550 oil—900 air	364	..	11,302	29,135

*Test No. 5: This material failed in service.
†Test No. 15: This is the peculiar condition known as Krupp Krankheit, which cannot be detected by the usual tensile test.

repeated stress is obtained by a hammer weighing 4½ lb. This is raised to a selected height, usually 2 in., and allowed to fall on the test piece, striking it near the middle, first on one side; then the test piece is rotated half a revolution and it gets a blow on the opposite side. This causes an alternating and localized stress at the bottom of the groove, which has a radius of about 0.020 in. The rate is 100 blows per min. and, when fracture occurs, an automatic switch stops the machine. A counter registers the number of blows.

Comparison With Alloy Steels

One would not imagine that a test bar, with a sharp notch, and case-hardened so that it was file hard at every point, would be able to resist repeated impact very well. Nevertheless the results obtained indicated that the steels commonly used in the automobile industry for case-hardening (carbon 0.10 to 0.20 per cent) when carburized to a depth between 0.040 and 0.060 in. and quenched after reheating to a temperature about 1500 deg. Fahr. may have a resistance to fatigue which is not approached by the finest alloy steels heat-treated in the usual way.

One difficulty in applying the case-hardening treatment (which gives a scleroscope hardness from 75 to 90) to parts of machinery, is that any severe bending or overload might crack the case. Such a condition may occur in manufacturing where straightening is necessary after hardening; or in the case of bolts, which are quite often stressed beyond their elastic limit in tightening up the nut. Steel with the regular heat treatment and say, 40 to 60 scleroscope, can take a reasonable overload of this description a number of times without much damage.

When straightening on case-hardened pieces must be done, it is customary to anneal or, by copper plating before carburizing, leave some section soft enough to withstand bending. This, however, will reduce the fatigue resisting properties, although it will stand a greater number of overloads. The difficulty referred to can be overcome to a great extent by suitable design. Hardness or resistance to deformation is necessary for great resistance to fatigue in high-duty steel. It was found, however, that high-carbon steels (over 0.50 per cent) treated to give great hardness, say 75 to 90 scleroscope, gave very poor results under the Stanton test, (see test No. 8 in Table No. 1.)

Stresses in High-Carbon Steels

Now we know that objects mode from high-carbon steel develop very high internal stresses when hardened. These stresses are sometimes sufficient to cause fracture even before the piece is put into service. In case-hardened steels the internal stresses are comparatively low and the available strength is not seriously diminished, as it undoubtedly is in steels which are hard throughout. Thus by case-hardening we give high elastic properties and resistance to deformation to the outer fibers of the steel and this is where it is most useful, because on high-duty members of machines it is the outer fibers which are most highly stressed.

Next to the case-hardened steels the best results are obtained on heat-treated alloy steels with carbon about 0.20 to 0.30 per cent, cooled quickly from about 1500 to 1600 deg. Fahr. and tempered if necessary to give a Brinell hardness between 375 and 430. In practice, it is easier to control the hardness in the tempering operation if the carbon is higher, but the internal stresses from quenching will be greater. No marked difference was observed between the various types of alloy steel of good quality and treatment. The size of the section to be treated had a considerable influence. The larger the section the more chromium, nickel, or other alloying element had to be used. All this agrees with the results generally found using alloy steels in practice.

Table No. 1 gives some typical results obtained on various kinds of steels not case-hardened. It will be noticed that properly heat-treated steel with a Brinell hardness between 364 and about 400 may withstand at best about 10,000 blows with the 2-in. fall of the hammer, and with the 1-in. fall about 40,000.

Table No. 2 gives some results on case-hardened

Table No. 2—Results on Various Steels, Case-Hardened

Test No.	Kind of Steel and Treatment	Depth of Case	Hardness		No. of Blows	
		In.	Brinell	Sclero	2-In. Fall	1-In. Fall
1.	0.20 per cent carbon screw stock—1400° F. water	0.027	...	85	4,169	.....
2.	0.20 per cent carbon screw stock—1450° F. water	0.027	...	85	15,835	.....
3.	0.20 per cent carbon screw stock—1650 and 1400 water	0.027	...	85	11,643	.....
4.	0.20 per cent carbon screw stock—1650 water	0.040	...	75	22,258	.....
5.	0.20 per cent carbon screw stock—1550 water	0.060	600	85	.....	837,285
6.	0.20 per cent carbon screw stock—carbonized only	0.040	...	38	653	.....
7.	0.15 per cent carbon 3.5 per cent Ni.—1500 oil	0.040	555	85	27,659	.....
8.	0.15 per cent carbon 3.5 per cent Ni.—1500 oil	0.040	...	85	37,151	.....
9.	0.15 per cent carbon 3.5 per cent Ni.—1500 oil	0.040	...	85	24,985	.....
10.	0.15 per cent carbon 3.5 per cent Ni.—1500 oil 350 air	0.040	...	83	20,013	.....
11.	0.15 per cent carbon 3.5 per cent Ni.—1500 oil 450 air	0.040	...	75	16,304	.....
12.	0.15 per cent carbon 3.5 per cent Ni.—1500 oil 550 air	0.040	...	72	13,404	.....
13.	0.20 per cent carbon 3.5 per cent Ni.—1500 oil	0.060	...	85	28,826	299,858
14.	0.10 per cent carbon 3.5 per cent Ni.—1500 oil	0.025	...	82	5,620	.....
15.	0.10 per cent carbon 3.5 per cent Ni.—1600 oil	0.025	...	75	7,085	.....
16.	0.10 per cent carbon 3.5 per cent Ni.—1500 oil	0.038	...	85	14,622	.....
17.	0.15 per cent carbon 3.5 per cent Ni.—1520 oil	0.060	...	85	.....	475,527
18.	0.15 per cent carbon 3.0 per cent Ni., 0.7 Cr. 1500 oil	0.065	600	85	.....	830,684

steels. With a sufficient depth of case and using the 2-in. fall, 20,000 to 30,000 blows are required to break the test piece, and with a 1-in. fall, several hundred thousand are required. Some of these tests are very interesting, for instance, No. 5, which was a piece of ordinary screw stock. This withstood on the 1-in. fall a greater number of blows than any of the alloy steels. No. 6 is the same steel carburized, cooled in the pot and tested without being hardened. This is a very bad condition for resisting alternating stress.

Tests Nos. 7, 8 and 9 are all from the same bar and treated alike. The effect of tempering the case-hardened nickel steel at 350, 450 and 550 deg. Fahr. is seen in tests Nos. 14, 15 and 16. Reducing the hardness lowered the resistance to the 2-in. blow.

Results obtained in engineering practice have been confirmed on the Stanton machine. The case-hardening process has been applied to various parts in automobiles, steam engines and machine tools and the opportunity taken to observe their behavior in comparison with other treatments. Very highly stressed parts like fluted shafts, gears, sets for pneumatic hammers and the like, which had a comparatively short life in the usual heat-treated steels of high quality, would last for years when replaced with properly case-hardened steels.

It is in the field of the small and light automobile, designed for endurance and economy in operation, that the fatigue resisting properties of case-hardened steel would seem to have great possibilities, because the small parts can be handled more easily in the hardening room. With the use of heat-treated aluminum alloys, balloon tires and case-hardened steering knuckles, gears and driving shafts, a great reduction of weight can be attained, with attendant advantages.

An Occurrence of Grain Growth in Steel

Further Results of Carbonizing, Hardening and Drawing Back— Comparison with Double Quenching and Drawing— Band Formations

BY A. A. BLUE

IT has been previously described how test bars of 0.15 per cent carbon and 3.43 per cent nickel steel, tested in the Landgraf-Turner testing machine, developed bands of enlarged grains extending laterally from the section of fracture, when the samples had been case hardened and drawn back to 1200 deg. Fahr., whereas these bands did not occur in the same steel double quenched and drawn back to the same temperature. It was also noted that the former bars showed only about half the life under test that the latter ones showed.

Additional and similar tests have recently been made along the lines indicated in the table. All results are the average of tests run in duplicate, and the band formation results were found to agree in each sample of the same conditions. The summation of these results is about as follows:

1. Carbonizing, hardening and drawing back to 1200 deg. Fahr. of all steels tested reduces the life of the bar in the Landgraf-Turner machine to about half of that of the same steel double quenched and drawn back to the same heat without carbonizing.

2. The formation of bands of enlarged grains occurs only in carbonized nickel steels, where the carbon does not much exceed 0.20 per cent, with the nickel about 3.50 per cent.

3. The formation of these bands in such nickel steel does not occur if the steel is drawn back after hardening to much less than 1200 deg. Fahr., as it was not found in such samples drawn back to 800 and 1000 deg. Fahr.

4. A deeper case using nickel steels under these conditions diminishes the life of the bar to

Fig. 1.—Left to Right, the Above Photographs Represent Structure at (Left) Fracture, (Center) 1 Inch From Fracture and (Right) 4 Inches From Fracture, of Bar After Testing in Landgraf-Turner Machine, and Show the Localized Band Formation of Enlarged Grains at the Fractured End. The steel analyzed as follows: C, 0.20; Mn, 0.51; P, 0.008; S, 0.019 and Ni, 3.38 per cent. It had been heat treated as follows: Carbonized at 1650 deg. Fahr. for 2 hr.; reheated to 1450 deg. and quenched in oil; and finally drawn back to 1200 deg.

THIS article is supplementary to one under the same title, published in THE IRON AGE *March 6, 1923. The author is technical director of the Duff Mfg. Co., Pittsburgh.*

The article just preceding this one, entitled "Case-Hardening and Fatigue Resistance," by John Miller, is a contribution to the same subject which Mr. Blue discusses in this and his previous article.

Fig. 2.—Shows Heavy Concentration of Bands in Broken Test Bar at Fracture. Same composition of steel as in Fig. 1. Same heat treatment as in Fig. 1, except carbonized at 1650 deg. for 8 hr., instead of 2 hr. No bands were found at the other end of this piece

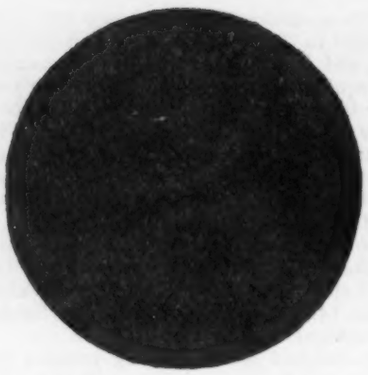


Fig. 3.—Shows Structure of Test Bar 4 In. From Fracture of Test Bar of Following Composition: C, 0.26; Mn, 0.74; P, 0.020; S, 0.022; and Ni, 3.29 per cent. Treated same as in Fig. 1. No bands at all were found in this sample

some extent and shows a somewhat greater formation of the bands.

5. From the fact that steels, which did not show the bands, were affected as to their life in the same manner as those that did show the bands, it appears that the bands themselves are not responsible for the reduced life of the bar under test.

Table of Tests on Various Steels

All rough bars of steel were treated as follows before machining: 1600 deg. Fahr., water quench; 1450 deg. Fahr., water quench, drawn back to 1200 deg. Fahr. Test bars 6 x ⅝ in. diameter were then cut from the original bars, the bars of each grade of steel being cut side by side. The samples were ground to size plus or minus 0.001. Treating after carbonizing was done in an electric muffle furnace to minimize scaling. The further history of the bars is as follows:

Steel Composition						Additional Treatment	Vibrations in Test	Band Formation
C	Mn	P	S	Ni	Cr			
0.07	0.38	0.091	0.050			None	643	None
						Carbonized 1650 deg., 2 hr., 1500 oil quench, 1200 draw	342	None
0.13	0.54	0.013	0.021			None	757	None
						Carbonized 1650 deg., 2 hr., 1625 oil quench, 1200 draw	380	None
0.29	0.68	0.009	0.026			None	660	None
						Carbonized 1650 deg., 2 hr., 1500 oil quench, 1200 draw	324	None
0.32	0.63	0.011	0.035			None	572	None
						Carbonized 1650 deg., 2 hr., 1500 oil quench, 1200 draw	351	None
0.20	1.19	0.044	0.030			None	576	None
						Carbonized 1650 deg., 2 hr., 1500 oil quench, 1200 draw	353	None
0.29	0.69	0.014	0.021	1.28*	.73	None	408	None
						Carbonized 1650 deg., 2 hr., 1500 oil quench, 1200 draw	214	None
0.16	0.51	0.008	0.017	3.27		None	583	None
						Carbonized 1650 deg., 2 hr., 1450 oil quench, 1200 draw	361	Heavy band formation at fracture, Fig. 1
						Carbonized 1650 deg., 2 hr., 1450 oil quench, 1000 draw	324	None
						Carbonized 1650 deg., 2 hr., 1450 oil quench, 800 draw	285	None
0.20	0.51	0.008	0.019	3.38		None	580	None
						Carbonized 1650 deg., 2 hr., 1450 oil quench, 1200 draw	347	Heavy bands at fracture
						Carbonized 1650 deg., 4 hr., 1450 oil quench, 1200 draw	296	Somewhat heavier band formation
						Carbonized 1650 deg., 8 hr., 1450 oil quench, 1200 draw	257	Still greater band formation, Fig. 2
0.26	0.74	0.020	0.022	3.29		None	630	None
						Carbonized 1650 deg., 2 hr., 1450 oil quench, 1200 draw	354	None, Fig. 3
						Carbonized 1650 deg., 8 hr., 1450 oil quench, 1200 draw	327	None

*Cr. 0.73 per cent.

Fig. 4.—Left to Right, These Photographs Are of (Left) Fracture, (Center) 1 In. From Fracture and (Right) 4 In. From Fracture. Bar had following composition; C, 0.16; Mn, 0.51; P, 0.008; S, 0.017; Ni, 3.27 per cent. The bar was copper plated with three longitudinal strips, $\frac{1}{8}$ in. wide, before carbonizing to prevent absorption of carbon in these areas. The bars were then treated as in Fig. 1

An additional result of interest was the following: It was thought that by plating the test bars with three or four narrow bands of copper, before carbonizing, the resultant areas of uncarbonized steel might offer sufficient opportunity for the increased internal strains, caused by the case, to escape, and perhaps lengthen the life of the bar, and eliminate the formation of the bands. This was tried out, using the 0.16 per cent carbon, 3.27 per cent nickel steel, and carbonizing for 2 hr. The results were exactly the reverse of those expected. The bars did not withstand any more vibrations than those carbonized and not plated, and the bands of large grains, far from being eliminated, extended the entire length of the bar, instead of near the fracture, as in the unplated samples. The effect is shown in the photomicrographs.

Improvement of Railroad Ways in Mahoning Valley

YOUNGSTOWN, April 22.—Taking advantage of current slack in freight movement, district railroads are beginning somewhat extensive maintenance-of-way improvements programs. The Erie, on its Ohio Region, will lay this year 15,000 tons of rails and will use 160,000 tons of slag for reballasting and new ballasting on the three main divisions of the region. Since April 1, when this work started, 600 men have been added to the labor crews.

Freight movement is scarcely holding up to the level of the first ten days in April. Lake coal has started to move, but in much less volume than a year ago at this time, when the Youngstown gateway of four important trunk line systems to lake ports was congested with cars.

The ore movement is also appreciably smaller, and the railroads have been advised it will be much less than last year. This is due to blast furnace suspensions which have already taken place and to curtailments planned for the near future. Furnace operators are backward in giving orders for ore, due to the quiet condition of the iron market.

Photomicrography and Technical Microscopy

"Photomicrography and Technical Microscopy" is the title of an interesting pamphlet issued by the Engineering Department of the Western Electric Co., New York. The author is Francis F. Lucas, of the research laboratory. Its 47 pages are beautifully illustrated with photomicrographs and other illustrations. The contents may be considered rather introductory to the subject of photomicrography. The application of this branch of the optical art to the study of metals is pointed to as very important in the design and manufacture of telephone apparatus but its importance in telephony is more far-reaching than in the study of metals alone. Various of these applications are suggested by the illustrations reproduced in the appendix. The paper, which is a reprint of one published in the Bell System *Technical Journal*, is also described as a discussion of equipment and optical parts, or the application of technical microscopy to the solution of different engineering problems involving telephone apparatus.

French Iron and Steel Exports in January and February

Exports of iron and steel products from France during the first two months of 1924 amounted to 452,875 metric tons, as compared with 360,520 tons during the corresponding period of 1923. Although exports of pig iron dropped in comparison with the preceding year, shipments abroad of ferroalloys show a considerable increase as do rolled or forged iron and steel. The influence of exchange, the reduction in the price of coke and the quantities of fuel available permitted the rather important figure of 223,400 metric tons of exports of rolled products, which represents more than 28 per cent of the production of the French rolling mills.

"Heat Enduring Castings" is the title of a book which discusses the subject of alloys suitable for the production of castings exposed to temperatures as high as 2100 deg. Fahr. It has been published by the Calorizing Co., Pittsburgh, which announces that the information contained therein is based on years of experience in the production of heat-enduring alloys by the General Electric Research Laboratory, by Victor Hybinette and by the engineers of the company. The introduction is devoted to a review of the work of Victor Hybinette. Then follow chapters on heat endurance, higher quality alloys at lower prices, temperature range, uses of heat-resisting alloys, followed by a chapter on general data.

The Standard Slag Co., Youngstown, has just completed a new slag disposal plant at the Haselton blast furnaces of the Republic Iron and Steel Co. For the present, the new plant will handle the slag output of three of the five blast furnaces in this group. Later on, it will be enlarged to take care of the slag from all of the stacks. The plant represents an expenditure of about $200,000.

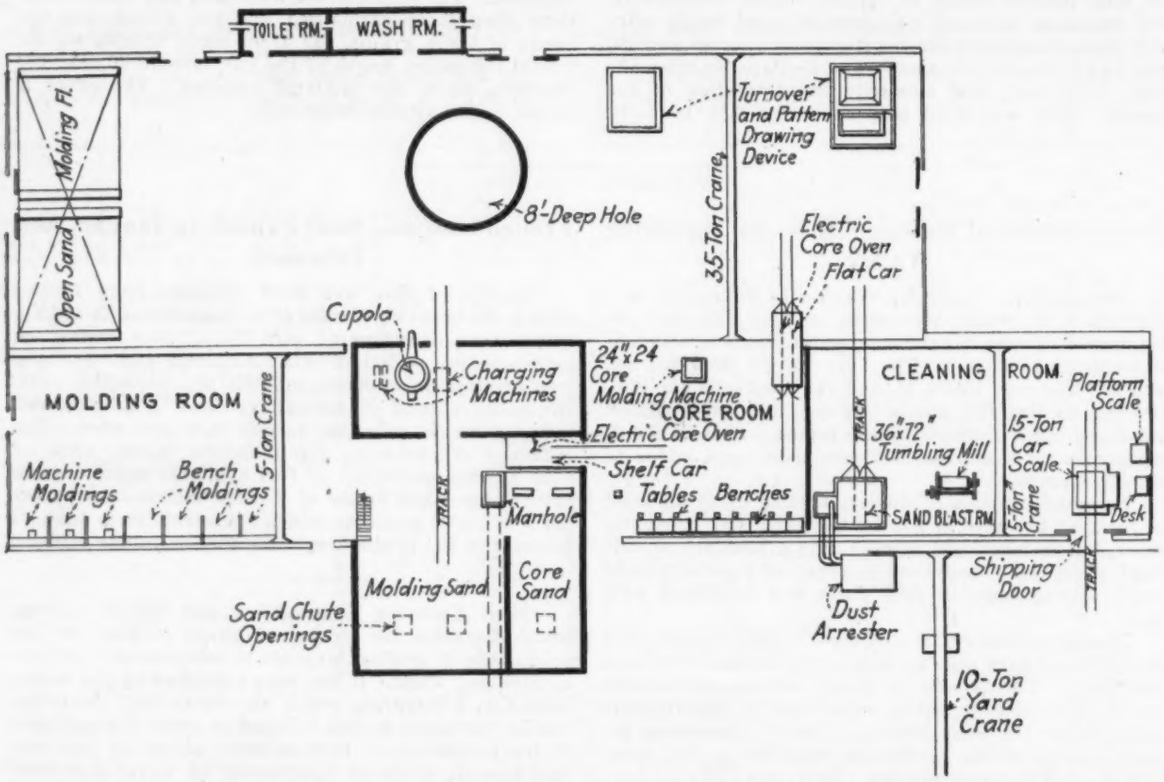
The convention of the International Railway Fuel Association to be held at Hotel Sherman, Chicago, May 26 to 29 inclusive, will be addressed by R. H. Aishton, president American Railway Association, and Charles Donnelly, president Northern Pacific Railway. Among the entertainment features will be an inspection trip of the new Koppers coke plant of the Chicago By-product Coke Co.

Foundry Designed for Heaviest Work

Adaptable to Light and Jobbing Work as Well—Unusually Large Electric Core Ovens and Pattern Storage Facilities

BY FRED L. PRENTISS

RECENTLY placed in operation by the McMyler-Interstate Co., Bedford, Ohio, is a gray iron foundry with a number of interesting features, such as the lighting and ventilation, its convenient arrangement and its handling facilities, including the method of handling and storing sand, which is placed in storage bins directly under the cupola charging platform. The foundry was built to manufacture castings used in locomotive cranes, car dumpers and other products, as well as to do jobbing work. Since many castings produced in this foundry run up to 15 tons in weight and are bulky in form, the plant is completely equipped to handle both large and small castings.



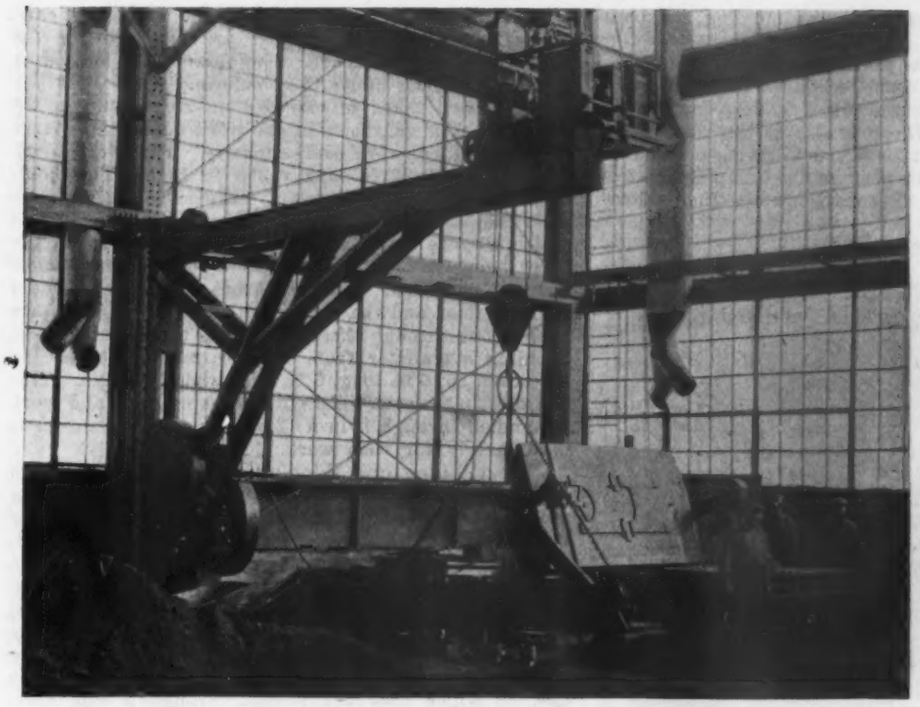
Compactness Is the Keynote of This Plan. Intercommunication is provided by the short sections of track. The main building (upper) measures 63 x 200 ft.

The main foundry building is 63 x 200 ft. At one side is the cupola room and charging floor 50 x 70 ft. and on each side of this is a leanto connected to the main foundry building. One of these leantos, 43 x 75 ft., is used for bench molding and the other is occupied by the core room, 43 x 50 ft., and the cleaning and shipping room, 43 x 75 ft. As the buildings are all joined, the entire plant, except the pattern storage department, is under one roof and the only partition is a section of brick wall 8 ft. high between the core and cleaning departments.

To provide sufficient head room under the electric traveling crane for handling large and bulky castings, to provide a crane runway well above the jib cranes and to assure good ventilation, the main foundry building is of good height. The distance from the floor to the roof truss is 35 ft. and the crane rail is 28 ft. above the floor. Practically the entire side surfaces of the building are of glass, the structures being covered with continuous steel sash in which are set standard ⅛-in. factory ribbed glass. The main building has a slightly pitched roof covered with cement slabs and asbestos roofing and is surmounted by a monitor. All downspouts are of cast iron soil pipe and are placed on the inside of the building to prevent freezing.

A unique method is provided for ventilating the foundry. Around the sides of the building is a concrete wall 2 ft. 7 in. high and above this are practically continuous ventilators of steel plate sections 3 ft. wide that are hinged at the top and swing out at the bottom, having stays to hold them in the open position. Above the ventilators the fixed windows extend to within 4 ft. of the eaves and here there are continuous 4-ft. hinged sash. In the monitor there are four lines of 4-ft. hinged steel sash which, with the swinging sash in the side walls, are operated by chains from the foundry floor. By opening the swinging ventilators close to the floor, and the ventilating sash at the top of the side walls and in the monitor, a good circulation of air is secured throughout the building. This results in the foundry floor being unusually free from smoke and heat when pouring during warm weather.

The main foundry floor is served its entire length by a 35-ton 60-ft. span electric traveling crane with a 10-ton auxiliary. It is also provided with four portable jib cranes of from 2 to 5 ton capacity. Pin connections are provided on each building column to receive these cranes and at the bottom is a nest of rollers to assure easy turning. The overhead crane is used to move the jib cranes from one column to another as required, and the latter are used for handling large patterns and



One Corner of the Main Foundry Building Near the Large Molding Machine, Showing the Type of Portable Jib Crane and the Swinging Steel Plate Ventilator That Extends Around the Building Close to the Floor. The electric traveling crane that serves the foundry is of sufficient height to permit its cage, that appears in the picture, to clear the jib cranes

flasks and for setting cores when the traveling crane is in use transferring cores from the core room to the foundry and handling the ladle under the cupola. The jib cranes are electrically operated, have electric control and can be operated very slowly when desired, as in setting cores. They have a reach of 20 ft. The movement of the trolley along the crane rail is by hand.

Pouring is done with the traveling crane, the runway of which is of sufficient height to permit the operator's cage to clear the jib cranes. The ladles used range from 6 to 1 ton capacity.

Near the center of the main molding floor is a pit 25 ft. in diameter and 8 ft. deep, having a 9-in. brick-lined wall, in which drums and other large castings are molded. At one end is an open sand molding floor 25 x 60 ft., having four rails so that a level floor can be provided by running a straight edge across the floor. This is used for making molds not requiring copes or having one-half the pattern in the pit, such as large counterweights. Two large Herman rollover draw-pattern molding machines are located at the other end of the floor. The larger will take flasks 112 in. long and 5 ft. 6 in. wide.

The cupola charging platform, 26 ft. above the ground level, extends out beyond the foundry leanto under an outside 10-ton electric traveling crane having a 60-ft. span, which handles all raw material from cars and from storage to the charging floor, eliminating the need of an elevator for serving the cupola. Beneath the charging platform is a sand storage room with two bins, one 28 x 32 ft. for molding sand and the other 18 x 28 ft. for core sand. These bins have a capacity of 400 tons of molding sand and 150 tons of core sand.

In the floor of the charging platform are three 36 x 36-in. plate-covered openings through which the sand, handled by a grab bucket attached to the crane, is dropped directly into the sand storage bins. As this room is at the temperature of the foundry, freezing of the sand is avoided in winter. The sand is wheeled to the molding floors and core room, first being prepared in Blystone sand-mixing machines, one for molding sand and one for core sand being located at the side

A Large Amount of Pattern Storage Space Is Provided Under One Roof by Having Pattern Storage Buildings 20 Ft. High, One Also Having a Basement. Patterns are stored in steel racks extending to the roof, the higher racks being made accessible by the use of sliding ladders

of the sand storage room, near the molding and core rooms.

Pig iron is stored alongside the railroad track that runs under the outside crane, while on both sides and under this track are concrete pits 4 ft. deep for storing scrap, limestone, etc. There is also at the side of the track a concrete coke pit 10 ft. deep, having a capacity for 12 carloads. This pit permits the dumping of coke from drop-bottom cars. From the pit the fuel is handled to the charging floor with the grab bucket. A magnet is used for conveying pig iron and scrap to the charging platform.

Double End Car-Type Electric Core Oven, 20 Ft. Long and 12 Ft. Wide, Is Used for Baking Large Cores. Its capacity is increased by having shelves for baking some of the smaller cores on each side of the oven. Electrically heated core ovens of this size are by no means common

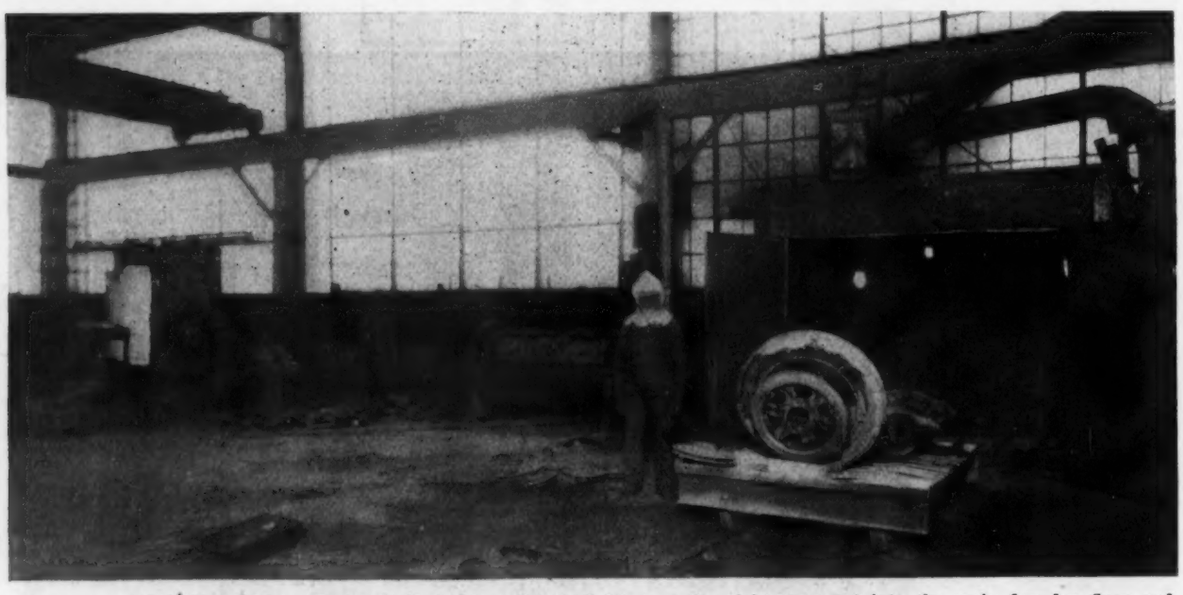
The foundry is provided with a 72-in. continuous melting Whiting cupola, space being provided for a second cupola. The location of the cupola brings the pouring spout out into the main foundry floor. The cupola is provided with mechanical charging equipment, and on the charging platform are a series of tracks and transfer tables for handling the charging cars. Two General Electric blowers are provided for the cupola, one being a spare. The blowers are located on a mezzanine floor under the platform.

Cores are baked in two electric ovens, both of the car type. The character of the work necessitates large cores and large core oven capacity. The larger oven is 12 ft. wide, 20 ft. long and 8 ft. high. This holds two core trucks provided with adjustable shelves. On each side of the oven there are also adjustable shelves which may be loaded with the small cores, the larger cores being left on the trucks. The oven has double doors at each end. The rear doors open into the main foundry floor and the trucks with the larger cores are pushed out through these doors into the foundry floor, avoiding a transfer from the core room. The second core oven is 16 ft. long, 6 ft. wide and 5 ft. high. This is a steel plate oven lined with asbestos brick and work is handled through it in a 12 x 4 ft. car. This oven is used mainly for rush work.

The cleaning and shipping room is provided with a Sly car-type 12 x 14 ft. sand blast and a Sly tumbling mill. A transfer track extends from the main foundry floor across the cleaning room and into the sand blast, so that the one track serves two purposes. The core room and adjoining cleaning department have a continuous crane runway equipped with two 5-ton cranes, one for each department, although, if needed, both may be used in either department. After the castings are cleaned and chipped, the crane places them on a scale car, on which they are pushed through a side door, bringing them under the runway of the raw material handling crane, which loads them with a magnet on a 24-ft. special railroad car. A dinky locomotive hauls this car to the receiving room of the manufacturing plant, where the castings are stored until needed. A railroad track also enters the main foundry building at one end, providing means for handling equipment into the plant and for taking out large castings.

Pattern Storage

Because of the character of the work, the company has to carry a large number of patterns. There are two 50 x 120 ft. pattern storage buildings 20 ft. in height. At the end of one building 25 ft. of the space is occupied by the foundry office. These are steel frame buildings with tile walls and 1¾ x 6 in. matched roofing covered with asbestos. Ventilation is provided by openings in the tile under the eaves and at the ground level, these being the only openings, except a steel entrance



Cleaning and Shipping Room. The track that enters the sand blast at the right runs out into the main foundry floor and serves as a transfer track from that floor. Castings are taken out through the door at the corner and the raw material handling crane outside loads them onto cars

door to each building. This is a safeguard against fire.

One of the pattern storage buildings has an 8-ft. basement in which the largest patterns are stored. A ramp leads from the entrance door into the basement. To keep the basement dry, there is an area-way 4 ft. wide on one side, the entire length of the building. At the bottom of the area is a concrete floor 18 in. lower than the floor of the basement. A 6-in. sewer pipe runs entirely around the building and discharges into the area-way. The water is carried away through the sewer that connects to the center of the area-way.

Patterns are stored on six steel racks running the full length of the buildings and extending up to the roof. In each aisle is a sliding ladder. A system of numbering is provided for the racks and shelves and a record is kept of the location of the patterns, so that there is no delay in finding any pattern wanted. The design of the pattern storage building with a basement and high roof is regarded as an economical plan in that, with the basement and the high storage room above, space that ordinarily would be equivalent to three floors is provided under one roof.

New Open-Hearth Furnace End

Some Practical Results from Its Use in Germany—Advantages of a Mixing Flue for Gases

A NEW design for the end of an open-hearth furnace was recently described in *Stahl und Eisen*. It has been developed by Hermann Moll. His object has been to secure a perfect mixture of gas and air before its admission to the hearth.

Use of a Mixing Flue

According to an abstract published by the London *Iron and Coal Trades Review*, he leads the gas and air into a common flue, designated as a mixing flue, and thence into the hearth as shown in Fig. 1. The end of the furnace is so designed that the gas flows without change of direction, and impinges at right-angles on the air current flowing upward. The bottom of the gas flue and that of the leading-in flue are approximately in the same plane, in order to prevent the air from flowing away below the gas stream and so setting up a refining action when such is not intended (pig iron and ore process). The arrangement is such that at the meeting place the air current is spread out so much and led so high that the air completely envelops the gas like a ring much in the same way as in the flame of a Bunsen burner. This prevents the gas current from breaking away sideways or from hugging the arch of the flue.

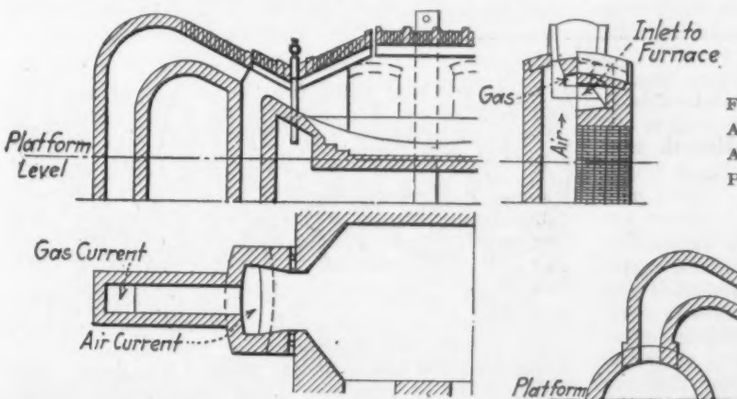
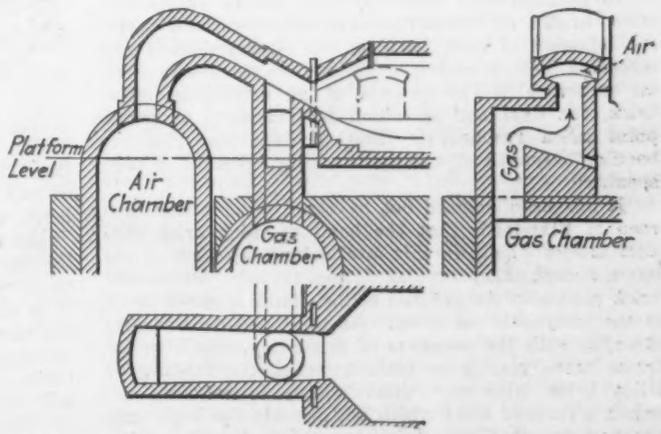


Fig. 1 (Above) — Moll's Method for Securing Perfect Mixture of Gas and Air for Open-Hearth Furnaces

Fig. 2 shows an alternative design arranged on the same principle. In this case the air current enters from behind and also envelops completely the gas stream entering the mixing and leading-in channel from underneath. This latter arrangement, of course, presupposes that the gas chambers are situated inside and the air chambers outside. It has the advantage from a fuel economy point of view that the air chambers can be continued to above the platform level, thus allowing a large increase in the height of the effective checker work even with a low platform or high level of subsoil water. Special slag chambers, moreover, can be dispensed with in this case as the gas flue can be arranged so as to serve the same purpose, and the slag can be tapped off easily in liquid form.

Fig. 2 (Below) Alternative Arrangement of Open-Hearth Air Inlets, Based on the Principles Adopted in Fig. 1



Numerous temperature measurements made in all the furnaces of the Rasselstein works and elsewhere have proved that with this new design of furnace end the gas and air, even when highly preheated, can, contrary to prevailing opinion, be conveyed together without the danger of preignition and the consequent risk of damage to the brickwork.

Obtaining Diffusion of the Gases

The writer came to the conclusion, however, when designing his furnace end, that it was not possible both to mix and ignite suddenly preheated gas and air, because the necessarily high rate of flow of the two media would prevent this. Time must be allowed for mutual

diffusion before mixing can become complete, and until such mixing is completed combustion cannot take place, nor can it be finished entirely until the process of mixing is terminated. A cone is formed as in the case of the Bunsen burner, only in the present case it is not a combustion cone, but a diffusion cone inside of which only unburnt gas is present. The base of the cone is formed by the outlet orifice of the gas flue, while the height of the cone is determined by the speed of the emerging gas and the velocity at which the air impinges on the gas current (the speed of diffusion). By varying these velocities, the length of the cone of diffusion can also be varied, thus enabling one to vary the place of combustion.

The fact that such a diffusion cone is formed, and that it can be varied according to the velocities of gas and air, even when these media are preheated above their ignition temperature, proves also that combustion cannot take place spontaneously. The diffusion velocity can be still further increased by not allowing the gas and air to expand, but by compressing the mixture by choking it in the leading-in flue. By this forced conveyance together of air and gas it is possible to work with the theoretical or minimum quantity of excess of air, while by suitably regulating the rate of flow of air and gas, and varying the diffusion cone by suitably selecting the dimensions of the leading-in flue, it is possible to begin and finish the main phase of combustion in the hearth itself without producing hurtful overheating in the leading-in flue.

Satisfactory Combustion

The author claims that every possible favorable condition exists for securing satisfactory combustion with his type of furnace head. It is a well-known fact that, besides differences in temperature, direct heat transmission by convection depends upon the velocity and the consequent turbulence of the flame, because the eddies formed thereby quickly allow fresh gas particles to come into contact with the bath of metal, to which they give off their heat. The turbulence effect is important also, because gases conduct heat very badly. The author, therefore, gives his flame the highest possible velocity by suitably dimensioning the leading-in flue, and makes the flame impinge on the bath at a very steep angle, thus braking the kinetic energy of the mixture and setting up turbulence.

Furnace ends of the new design are said to be extremely easy and cheap to construct. The saving in masonry and anchoring works out at about 60 to 70 per cent of the ordinary type of furnace ends; whereby, of course, much time is saved in repair work. A further considerable saving in repairs, etc., is due to the fact that the masonry of the new type of furnace end can be very quickly heated up compared with the heavy mass of masonry of the ordinary type of furnace end, which has to be heated up very slowly and carefully in order to prevent cracking of and other damage to the brickwork.

Practical Results in Germany

One steel works using five furnaces, with ends of the first described of the two alternative designs, has attained, on 411 heats, an average throughout time of 5 hr. 3 min. in the case of 10-ton furnaces having a yield of 11 tons, and an average period of heat of 5 hr. 13 min. over 482 heats with the 30-ton furnaces with a yield of 31.6 tons. The best results were obtained with the 10-ton furnaces with an average of 37 to 38 heats a week, while the 30-ton furnaces gave 28 to 30 heats a week. In another plant, at which a number of 30-ton furnaces are at work, an average of 4.44 tons per hour are produced when working without pig iron, or 5.3 tons per hour when working with 21 per cent of pig iron.

SILICA BRICK OF CONSTANT SIZE

Made by Special Process for Open-Hearth and Other Uses—Has Fixed Volume and Will Not Expand

In common with practically all known substances, silica bricks of ordinary construction expand under the influence of heat. Science has clearly defined and identified five successive inversions or changes in crystal structure in the process of an expanding silica brick, the final one of which is tridymite, at which point silica reaches its limit of expanson and the bonding strength of the interlocking crystals is then spent.

It has been pointed out by the United States Bureau of Standards that the bond in silica brick consists almost wholly in this interlocking cohesion of the various expanding crystal forms through which the brick passes in its gradual change from a green brick to the tridymitic condition. As this bond decreases in strength with the progress of expansion, which in extreme cases results in disintegration, the making of silica brick with an initial tridymitic conditon requires a form of bond which will sustain the high temperature to which the brick is subjected, without becoming disintegrated.

Some years ago an Italian investigator developed a brick which was designed along these lines and had his ideas patented in many countries. It happened that these ideas could not be commercially adapted and no brick were successfully manufactured under his patents. A method of making brick having these characteristics has now been devised by Charles J. Crawford, New York, and the process has been patented in the United States.

Mr. Crawford's patent discloses a method of converting quartz or silica material to tridymite by means of a gaseous catalyzer used in burning the product to expand it to tridymite, with specific gravity of 2.26 to 2.33. It is claimed that by this method no part of the catalyzer (flux) becomes a part of the tridymite so made, and thus eliminates the addition of any flux, and even makes it possible to avoid the addition of lime, which is also a flux. The patent also discloses a method of weathering a high alumina flint clay and using this as a binder for the tridymite made by catalytic action. The product is made into brick and again burned, giving a silica brick consisting of tridymite bonded with a flint fire clay made of high alumina content.

By this method a brick of fixed volume is made; fixed volume, in that it neither expands nor contracts under a continued application of high heat, but remains the same size as it was when it was made. The fusion point of flint clay being considerably higher than that of quartz or silica material, and the absence of any fluxing material, as lime, etc., or a green brick bond, should add materially to the refractory value.

In manufacturing refractory shapes, their size is limited more or less by reason of the molecular movement which takes place under heat. In silica material it is expansion; in clay material it is contraction or shrinkage. It is claimed that this new process can be developed to such an extent that monolithic refractories structures can be made. Furnace roofs then will be made in sections which will span the roof.

The Bureau of Standards comment is that a tridymite brick would be a perfect silica brick but, inasmuch as its manufacture by the direct application of heat would require possibly fifty successive burnings, this makes it a commercial impossibility. Numerous experiments and attempts to convert silica to tridymite by the addition of fluxes have been made, but the fluxing material added became a component part of the silica brick and lowered the fusion point so much as greatly to impair its refractory value.

The development of American standards for flanged and screwed fittings used in the installation of ice making and refrigeration equipment is to be started at a meeting scheduled for Wednesday morning, May 14, at 10 a. m., in room 1101 of the Engineering Societies' Building, 29 West Thirty-ninth Street, New York.

Metal Trades Anniversary Celebration

National Association Reviews Twenty-five Years and Looks Forward to Constructive Service—Numerous Important Subjects Considered

TWENTY-FIVE years ago the National Metal Trades Association was organized purely as a defense body to resist the encroachments of organized labor. In the past three years there has been an almost complete freedom from serious labor disturbances, with the result that the association has given more than customary attention to efforts to promote the interests of members along constructive lines. This was emphasized in the proceedings of the convention at the Hotel Astor, New York, on April 23 and 24, when the association embarked upon its second quarter of a century with new ideas of service to the metalworking industries of the country.

One of the most constructive efforts the association has started is the establishment of a department of industrial relations, which shall have for its object the studying of the various methods now employed to bring about closer harmony between management and workers and to recommend to the members the most successful plans in vogue. By resolution the association appropriated $10,000 for work in industrial education during the year, this being a feature of the association's activities in which great strides have been made in the past few years.

A considerable part of the convention time was allotted to discussions of industrial training and the place of the physician in industry.

Paul C. De Wolf, Brown & Sharpe Mfg. Co., Providence, R. I., though not present at the meeting because of slight injuries suffered recently in an automobile accident, was elected president to succeed W. W. Coleman, Bucyrus Co., South Milwaukee, Wis., who has served the association for two and a half years. Paul T. Norton, Case Crane & Engineering Co., Columbus, Ohio, was elected vice-president; Harold C. Smith, Illinois Tool Works, Chicago, second vice-president; and John W. O'Leary, Arthur J. O'Leary & Son Co., Chicago, treasurer. The following councilors were elected:

For two years: Horace P. Dix, Wilmarth & Morman Co., Grand Rapids, Mich.; C. W. Russell, Russell Wheel & Foundry Co., Detroit; Frederick Fosdick, Fitchburg Steam Engine Co., Fitchburg, Mass.; C. B. Hayes, Hayes Wheel Co., Jackson, Mich.; C. R. Gardiner, International Silver Co., Meriden, Conn.; W. D. Oakes, the Oakes Co., Indianapolis.

Councilors to fill unexpired terms of Harold C. Smith and Paul T. Norton: W. W. Coleman, Bucyrus Co., South Milwaukee, Wis.; E. J. Miller, St. Louis Screw Co., St. Louis. Honorary councilor: Justus H. Schwacke, William Sellers & Co., Inc., Philadelphia.

Importance of Human Relations Stressed

In his presidential address, W. W. Coleman stressed the importance in industry today of the human relationships.

"It is true," said Mr. Coleman, "that in the beginning our organization was one for defensive purposes only, but as it grew and prospered, its defensive features gradually have come to occupy a minor place in its activities. It is now an organization for strongly constructive purposes, always keeping abreast of the times and often ahead of them in those things which better conditions in industry and improve the human relations therein.

"No one realized 25 years ago that the metal trades would become one of the greatest industries of our country nor could they possibly have realized how important a part the National Metal Trades Association was to play in keeping this rapidly growing industry almost completely an 'open shop' one. It must be a source of great satisfaction to our older officers and members to see the great extension of the principle of the 'open shop' to which they have adhered so long and steadfastly. It would not surprise me if at some time in the future we should hear trade unions claiming that they have always believed in the 'open shop.'

Not a Conspiracy

"There are some who ascribe the phenomenal success of the 'open shop' in the metal trades and other industries to a conspiracy among employers to destroy organized labor. I have never heard of any such conspiracy and I cannot believe that even if one existed, it could have been so highly successful. In my opinion we must look for a constructive rather than a destructive cause. I believe it will be found in part in the general support given the 'open shop' principle by the public because of belief in its fairness and justice. This support by the general public was perhaps induced to a great degree by the abuses and transgressions of which a number of the labor unions have been guilty. There is, however, I believe, a stronger reason than this for the success of the 'open shop,' and that is, the workers themselves believe in its principles and have found through experience that working conditions are better and opportunities greater for advancement in open shops than are found in the uneconomic conditions which exist in the closed union shop.

"There is no doubt that this association has played a great part in keeping the plants of our members free from vexatious labor disturbances. This is a part of the work which it is difficult for members to visualize. It is easy enough to recognize trouble when it comes, but it is difficult to recognize trouble which has been kept away. For more than three years the plants of our members have been almost entirely free from strikes or similar interruptions to productivity and surely we can claim no greater constructive effort than this."

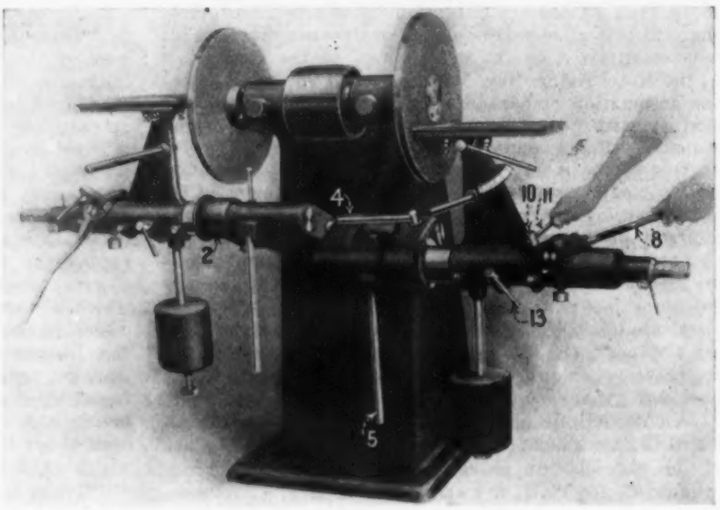
With regard to industrial training, President Coleman commented on the work which the association has done, for many years without successful results. Now, however, he said, "many industrial leaders and other thoughtful men in all parts of the country are advocating what our officers recognized as a necessity so many years ago." The work which the association has done in behalf of accident prevention was also emphasized.

"The brains of industry in the past," said Mr. Coleman, "were centered on means, methods and economy of production as the major factors in industry. In recent years they have apparently turned more toward human relations. There has been a more general recognition of the fact that while the rates for labor are a matter for barter depending in a measure upon supply and demand, it is also true that when the contract has been made the factor of human relations has been introduced. The National Metal Trades Association was among the first to recognize this and give expression to it through its members who established in their plants many of those things which tend to improve working conditions and the relations between employer and employee. I refer to educational and training systems for foremen and workers, physical examination, medical, surgical and nursing attention, and in providing greater opportunities for workers to express themselves about conditions under which they work. One of the great accomplishments in this direction has been the introduction of the physician in industry. Much has been done in keeping men physically fit for work and in assuring proper medical and nursing attention

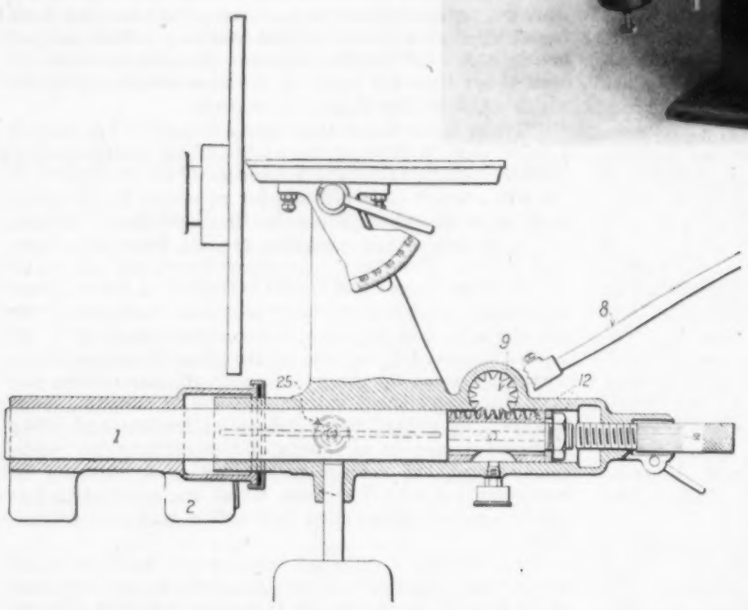
(*Continued on page* 1324)

Table Raising and Lowering Mechanism a Feature of New Disk Grinders

A new line of disk grinders, an outstanding feature of which is the table raising and lowering mechanism incorporated, has been recently placed on the market by the Carpenter Engineering & Machine Co., Minneapolis. Dust-proof construction throughout is a feature claimed, as well as provision for making adjustments without the use of a wrench. The feed lever may be adjusted quickly from the horizontal position, for ring wheel grinding, to a vertical position for light disk grinding. The carriage may be clamped quickly and the micrometer also. Adjustment of the weight is not required to compensate for changes in the elevation of the table.



New Disk Grinder Available in 18 and 20 In. Sizes. The arrangement of the feed mechanism is shown in the drawing below



The general construction of the machine, which is at present available only in two sizes, 18 and 20 in., may be noted from the illustrations. The table arm or carriage is mounted upon the stud, 1, which is secured in the outer ends of the U-shaped bracket or link, 2. The inner ends of the link are pivotally mounted on the inner stud, around which it is angularly adjustable, thus varying the elevation of the table. To assist in making these adjustments the lever 5 is provided, this lever when not in use dropping to the vertical position, as shown. The inner end of the U-shaped bracket or link has a cross bore which intersects the 2½-in. bore surrounding the inner stud, clamping blocks and a bolt being fitted into the intersecting bore. The clamping is actuated by lever 4, operation of which clamps the link and holds the table at any elevation required.

The table elevating mechanism described is emphasized as an advantage in that it permits the operator to adjust the table to any desired elevation quickly, without the use of a wrench or other tool, and without uncovering any of the finished wearing surfaces of the mechanism to the admission of grit or glue. Readjustment of the weight also is unnecessary.

The method of securing the table in its angular adjustments may be noted from the lower right-hand illustration. The projecting arm of the table carriage is forked at its upper end to fit over the projecting lug of the table. The quadrant collar 7 and the similar collar minus the quadrant at the other end are secured against the outer surfaces of the forked portion of the arm by the clamping bolt as shown, the bolt being operated by the handle at the right. This arrangement is intended to provide four clamping surfaces and obviate the usual curved slot and auxiliary clamping bolt in the lower part of the quadrant. The table feed arrangement is considered unique in that the table and carriage are advanced toward the disk together along the stud 1, upon which the table carriage oscillates, instead of it being advanced independently.

The arrangement of the feed mechanism may be noted from the sectional line drawing at left. The feed is operated by the lever 8 which is adjustably secured to pinion 9 by means of the handle and clamp screw shown in the half-tone illustration at 10 and 11. The pinion meshes with rack teeth cut in the bushing 12, which is prevented from rotating within the carriage by a keyway and pin. The bushing is fitted accurately within the carriage and also to the reduced portion of the stud 1, upon which it may oscillate and to which it is retained by the nut and washer. To obviate the entering of dust at the forward end, the carriage is arranged to telescope within the bracket 2, from which it cannot be withdrawn without removing the feeding pinion. The table carriage may be clamped rigid by a partial turn of the tail screw 13.

The micrometer screw reads in 0.001 in. and abuts the outer end of the carriage stud 1, within the dust proof area containing the feed works. The micrometer may be clamped to any setting by the tail screw shown beneath the barrel.

The spindles of the machine are 2⅛ in. in diameter, are mounted in ball bearings and revolve at 1800 r.p.m. Ball thrust bearings, conveniently adjustable for wear, are provided to take the end thrust. The weight of the machine illustrated is 1500 lb.

American Welding Society Annual Meeting

Electric and Gas Welding Discussed in Varied Applications —Technical Matters and Reports of Progress of Committee Work

FEATURED by progress reports from numerous technical committees which have been operating for two years or more, under the direction of the American Bureau of Welding, the American Welding Society held its annual meeting in the Engineering Societies Building, New York, April 23, 24 and 25. A further session, scheduled for April 26, at which specifications for steel to be welded were to have been discussed by a committee under the chairmanship of W. J. Beck, director of research American Rolling Mill Co., Middletown, Ohio, was postponed.

Technical committee meetings were held April 23 and 25 by the Resistance Welding Committee, Hermann Lemp, General Electric Co., Erie, Pa., chairman; Electric Arc Welding Committee, H. M. Hobart, General Electric Co., Schenectady, N. Y., chairman; Gas Welding Committee, S. W. Miller, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., chairman.

The annual smoker came on the evening of April 23, with the third annual dinner the next evening. On the evening of April 25 was a technical session devoted to two subjects: "Flexibility vs. Rigidity in the Design of Welds," handled in the form of a symposium and to be covered in abstract next week, and "Welding in Railroad Shops," a paper by A. G. Pack, chief inspector Bureau of Locomotive and Boiler Inspection, Interstate Commerce Commission, Washington.

On Friday morning, April 25, the American Bureau of Welding—the research division of the society—held a session, receiving progress reports from eleven technical committees and reelecting its officers.

Electric Arc Welding

UNDER the chairmanship of H. M. Hobart, General Electric Co., Schenectady, the electric arc welding committee discussed the welding of street railroad rails, fabrication in structural work by welding in place of riveting, welding of non-ferrous metals, and briefly the use of fluxes and slags in welding.

Street Railroad Work

E. M. T. Ryder, Third Avenue Railway System, New York, spoke on welding of rails for trolley track and on tests which have been made to determine the adequacy of the welds. He pleaded incomplete results, but said that the work is going forward, though slowly. "Because a certain type of rail joint stands up best under the conditions of the test is no argument that it will be best in service under the repeated pounding of the wheels," said Mr. Ryder.

He pointed out that there are approximately 25,000 miles of street railroad track in paved streets in the United States, laid at a cost approximating $50,000 per mile, thus producing a property valued in the aggregate at more than $1,000,000,000. Assuming a 20-year life, this would involve replacement charges of about $75,000,000 per year. If, therefore, it becomes possible to extend the life to 25 years, the annual replacement expense will be reduced to $60,000,000. For purposes of testing an appropriation of $20,000 was asked.

The repeated impact test used consists in dropping a 400-lb. hammer from a height of 6 in. at the rate of 30 blows per minute. These blows are delivered at a point 3 in. from the joint on the receiving side of the joint, that is, the side which the wheel strikes on passing the joint and where it tends to make a hollow. Corrugations on the surface of the rail occur from this point onward, but the exact cause is one of the mysteries of street railroad work.

Welding Structural Members

W. L. Warner, General Electric Co., Schenectady, read a paper on structural steel welding, illustrated by lantern slides. He detailed tests made on full size spans, showing in one case the results of a load up to the elastic limit of the material which had produced a deflection in the center of the span amounting to 5/16 in. When the load was removed, remaining or permanent deflection was 1/16 in. in a span of 30 ft. This structure was welded at all points, with no rivets. This was an extension of work done previously and published in THE IRON AGE May 25, 1922, page 1422, under the authorship of E. S. Humphreys, Jr.

One of the main advantages, pointed out by Mr. Warner as likely to follow the general introduction of welded structures designed as such, is a considerable decrease in weight, with corresponding lowered cost for materials. He estimated the saving in structural members at 16 2/3 per cent plus the weight of the rivets, this comparison being in favor of arc welding.

James W. Owens, United States Navy Yard, Norfolk, Va., who has been in charge of welding experiments and welding work at that point for the past six years, made a strong plea for the use of a lap joint wherever possible, as opposed to a butt joint. His remarks applied particularly to ship work but, from the point of view of structural strength, the principles hold universally. A plain lap joint made with one full fillet, he said, has about 40 per cent of the strength of the original member. With two full fillets more than double the strength of one fillet is obtained, because the material is not then subjected to tearing. He estimated the strength of a plain lap joint with two full fillets at from 90 per cent to 100 per cent or more of that of the structural member.

When the joint is reinforced he placed the figures at 65 per cent for one full fillet and 130 per cent or more for two full fillets, the latter case indicating that the break, if any, would be in the plate rather than in the weld. Current for making these joints was specified as 325 to 375 amperes, while electrodes of ¼ to ⅜ in. should be used, he stated, as good results cannot be obtained with the smaller sizes, such as ⅛ to 5/32 in.

Trouble from cracked butt joints, according to Mr. Owens' experience, has been considerable. He referred particularly to steel target frames made up for navy target practice, in which butt joints had been used and the target broke in two. With lap joints no trouble whatever has been experienced. Shipbuilding steel is of approximately 0.25 per cent carbon and the welding procedure must be made to fit this case. There is no likelihood that shipbuilders will change their steel specifications to suit the convenience of those welders who desire a different kind of steel to work on. If dead soft steel were used, for instance, the tensile strength of the material would be less and greater weights would be called for.

Non-Ferrous Welding

Welding of copper to steel with both the carbon arc and the metallic arc was reported to give no difficulty. This is particularly important in connection with the bonding wires in electric railroad track. Using the metallic arc it is recommended that a little silicon (0.1 to 0.2 per cent) be used in the steel, with the idea of getting rid of blowholes. This improves the quality of the welded metal and does not decrease the tough-

ness of the copper. It was pointed out that, in general, gas welding is far ahead of electric welding so far as non-ferrous metals are concerned. Monel metal, however, forms an exception to this rule.

William Spraragen, secretary American Bureau of Welding, spoke briefly on the use of fluxes and slags. He announced that the April issue of the society's *Bulletin* will carry an article on this subject, based upon a letter which he has written to the (English) Faraday Society, dealing with this subject. In the discussion it was brought out that the Quasi-arc method of welding, which is largely used in England, makes use of a coated wire, with which the English get excellent results. The same operators cannot get good results with bare wires. Similarly, the American operators, accustomed to the use of bare wires, cannot get good results with the covered wire. The question of cost of the covered wire was brought up. It was maintained by C. J. Holslag, Electric-Arc Cutting & Welding Co., that this cost question of covered wire is a bugaboo, inasmuch as the operation is much faster than with bare wire, whereby the saving in labor charges much more than offsets the added material cost of the covered wire.

Plans for Further Work

As the special committee has practically finished its work on structural steel, it is proposed to proceed with a good deal of vigor on the non-ferrous metals. The subject of welding of cast iron was strongly suggested as one to be taken up by the committee, to fill the gap in its work made by the completion of the structural steel program. It was pointed out that, while a great deal of work in welding cast iron is being done electrically, little in the way of experiment or in the codification of results has been accomplished.

Navy Yard Inspection Trip

About 100 members visited the Brooklyn Navy Yard, primarily to see the work of demolition proceeding under the oxy-acetylene torch on the uncompleted battleships Indiana and South Dakota, and to see some of the welded metal work in the shops of the yard. This latter consisted largely of exhaust piping for Diesel engines for submarine use, which were made up of steel sheets welded into "Y" shapes and other forms for this use. One of the 1000-hp. engines was observed under shop test at reduced power with these fittings in place.

After leaving the machine shop a visit was made to the gas plant, where acetylene is manufactured and placed in tanks under pressure, and where oxygen and other gases are prepared, compressed and placed in tanks for use where needed. The acetylene is made at low pressure, calcium carbide being dropped in a fine but steady stream from a hopper into the water tank at the bottom of the machine. Oxygen was being tanked at pressures up to 1000 lb. Some of the tanks under test were being given a pressure of about 3000 lb. The oxygen plant is capable of producing 10,000 cu. ft. in 24 hr.

On the two uncompleted battleships, which are being scrapped in accordance with the requirements of the Washington Conference on Limitation of Armaments, about 18,000 tons of steel is being cut up. Each vessel is being handled by 12 cutting gangs, the plates and attached angles being cut into shipping sizes, which are approximately 8 ft. wide by 20 to 30 ft. in length. The rate of production of scrap is approximately 1000 tons per week. This is being loaded directly into railroad cars, which run in on spurs under the craneways under which the ships were being built.

Election of Officers

Officers for both the American Welding Society and the American Bureau of Welding were elected. Those of the American Welding Society form a new group, while those of the Bureau were reelected. The lists follow:

American Welding Society.—President, E. H. Ewertz, general manager Moore Plant, Bethlehem Shipbuilding Corporation, Elizabeth, N. J.; vice-presidents, T. A. Wry, General Electric Co., Boston, Mass.; J. D. Conway, secretary-treasurer Railway Supply Manufacturers' Association, Pittsburgh, and Henry S. Mann, Metal & Thermit Corporation, Chicago. Directors for the term expiring in 1927, J. H. Deppeler, Metal & Thermit Corporation, New York; A. S. Kinsey, Air Reduction Sales Co., New York; E. M. T. Ryder, Third Avenue Railway System, New York, and W. A. Slack, Torchweld Equipment Co., Chicago.

American Bureau of Welding.—Director, Prof. Comfort A. Adams, Harvard University, Cambridge, Mass.; secretary, William Spraragen.

American Bureau of Welding

AT the Friday morning meeting of the American Bureau of Welding progress reports were received from eleven research committees dealing respectively with electric arc welding, gas welding, welding of storage tanks, pressure vessels, standard tests for welds, welding wire specifications, training of operators, resistance welding, thermit welding, welded rail joints and specifications for iron and steel to be welded. Of these committees, those dealing with welding of storage tanks, pressure vessels, standard tests for welds and training of operators have completed their work and have been relieved of further duty.

In the report on thermit welding, attention was drawn by the chairman, J. H. Deppeler, Metal & Thermit Corporation, New York, to the fact that the principal efforts of the committee and of his company during the past year have been directed to improving the quality of the thermit metal, especially as regards ductility. He reported that the 60,000 lb. tensile strength of the past has given way consistently to 80,000 lb. today and that some tests had reached 110,000 lb. These latter, however, were at the expense of the desired amount of ductility.

Structural Research

It was arranged to start a new committee, to be known as the Structural Research Committee, the duties of which are to be to determine best methods of welding for buildings, bridges, ships and other steel structures. This will coordinate in a measure the work which has been done on the welding of structural steel and the work of the various committees devoted specifically each to some one phase of the welding problem—in particular, the electric arc, resistance welding and welding wire groups. Appointment of this committee is yet to be made.

Spirited discussion arose at the close of the meeting over the question of the proper size of electrodes to be used for arc welding work. James W. Owens, United States Navy Yard, Norfolk, Va., argued for a large electrode, up to ⅜ in. diameter, and a heavy current, up to 325 or even 375 amperes, when working on heavy material. He maintained that the heat absorption qualities of this material are such that the use of small electrodes under these conditions makes the work so slow that it cannot compete in cost with riveting. He admitted that the use of these heavy current values and large electrodes cuts down very materially the ductility of the deposited metal in the joint. He stated, however, that, inasmuch as it is possible by this means to make a lap joint stronger than the original material, thus throwing the burden of accepting stress outside the joint entirely, this matter of ductility in the joint is of purely academic interest.

His points were combated strenuously by other speakers, who maintained that ductility retains the same importance here as in other engineering work and that a reduction to 6 per cent elongation is not permissible. The fact that the deposited metal is essentially a cast metal has its bearing, but cannot, in the opinion of these speakers, be permitted to nullify the need for ductility.

(Abstract of the Symposium will be published next week.)

The Advance in Electrolytic Refining

American Electrochemists Take Up Electric Furnace Refractories and Refining of Metals at Annual Meeting in Philadelphia—Fused Quartz

A SYMPOSIUM on electrodeposition, and a round table discussion on refractories for electric furnaces were the features of the annual, or forty-fifth, meeting of the American Electrochemical Society, held at the Bellevue-Stratford Hotel, Philadelphia, last week, April 24, 25 and 26. Symposiums planned by this society are uniformly successful and this one was no exception. The round table luncheon discussion outstripped all plans and expectations.

Symposium on Electrodeposition

The symposium on electrodeposition was divided into two parts, one having to do with electroplating and kindred problems and the other dealing with the commercial and technical phase of the refining of metals by means of electricity. The entire symposium was organized by S. Skowronski, Raritan Copper Works, Perth Amboy, N. J. The first part contained 12 papers and the second part 11 papers which discussed the winning of copper, tin, lead, zinc, iron, beryllium and some rare metals.

The session covering the commercial phase of electrodeposition was held Saturday morning, April 26, and was introduced by an unusually comprehensive and authoritative address by the chairman, Mr. Skowronski, which dealt with the progress of electrolytic refining of metals up to the present time.

Progress in Electrolytic Refining

Mr. Skowronski said that the discussion of the commercial recovery of metals should be divided into two parts, the first where refining is achieved by the anode-cathode process and, second, where the recovery is from solutions by electrolysis. Taking up the first subdivision, the author said that the electrolytic recovery of copper was now in its fifth decade, that it was well developed and that no radical changes had appeared in the last decade. As a result of the war years, there had been a great increase in capacity, the expansion being about 57 per cent since before the war. One refinery alone in this country is now making more copper than all the refineries did in 1900 and more than was produced in the world only a few years before that. An important development in this industry has been the recovery of metals from by-products, due partly to their value and partly also to the problem of their accumulation.

The electrolytic refining of zinc from spelter by the anode-cathode process, he said, has been a commercial failure because of its expense. In lead some progress has been made in the Betz process as well as in the Parks process. Electrolytic lead has some advantage over zinc because of its higher price.

Electrolytic Tin

Discussing tin, Mr. Skowronski said that the commercial refining of tin by electricity had reached a fairly large scale in this country in the last 10 years and that the product was of the highest purity. The development of an electrolyte for tin, where tin exists as a sulphate, was the principal development in this industry and was due to the work of American metallurgists. It has been demonstrated, however, that electrolytic tin cannot compete with Straits tin and, as a result, electrolytic tin plants in this country have recently been closed.

The principal development in the nickel industry has been the progress made in the Hybenite process, which is now in use in Norway and Canada. Its principal advantage is an economic one because it involves the successful recovery of such precious metals as palladium, platinum, irridium and rhodium. The disadvantage of this method, said the speaker, was that the separation from cobalt was not possible and therefore that it cannot compete with the Mond process, where copper sulphate is also a factor.

Electrolytic Iron

Electrolytic iron, said Mr. Skowronski, is now being made by the Western Electric Co. to the extent of 25,000 lb. each week from a sulphate of iron and ammonium chloride solution, the product having a purity of 99.97 per cent. At Grenoble, France, boiler tubes of electrolytic iron are being made on a revolving mandel from ferrous chloride, the anode being cast iron. In Germany during the war shell bands of electrolytic iron were successfully made and used as a substitute for copper.

Under the second general subdivision, that of recovery of metals from solutions by electrolysis, Mr. Skowronski stated that the outstanding development had been the application of this principle to copper and zinc in solutions.

Electrolytic recovery of zinc from a sulphate solution has solved the zinc-lead-silver ore problem, flotation having made this process possible. As to copper, while the hydrometallurgy of this metal was complicated, the invention of the Chilex anode by an American metallurgist, the secretary of this society, had simplified the recovery of copper from Chilean ores, the operation in that country being an outstanding example of this process.

Fused Electrolytes

The speaker closed with a reference to the possibilities of electrodeposition from fused electrolytes. Pointing to aluminum as the chief example of this method, he stated that magnesium and calcium were already being obtained from the fused chlorides and that sodium could be manufactured from fused caustic soda by electricity.

Following the opening address of Mr. Skowronski, the regular papers were taken up for reading and discussion.

Chilean and South African Copper

Two important papers dealing with the recovery of copper in South America and in South Africa were presented in abstract. Both of these were considered as valuable contributions and the society was congratulated on having been able to secure them. One was entitled "The Electrolytic Tank House, Chile Exploration Co., Chuquicamata, Chile," by C. W. Eichrodt of that company. The paper describes the process as carried out in Chile, explains the method used to overcome the presence of nitrates and chlorides in the original ores, discusses the new copper silicide or "Chilex" anode, and states that the marketable copper has an average purity of 99.96 per cent copper. The other paper was entitled "Electrodeposition of Copper by the Union Miniere de Haut Katanga," by H. Y. Eagle of the company's New York office at 25 Broadway. The paper describes the new electrolytic tank house and its operation which is stated to be the largest of its kind ever built.

Recovery of Tin

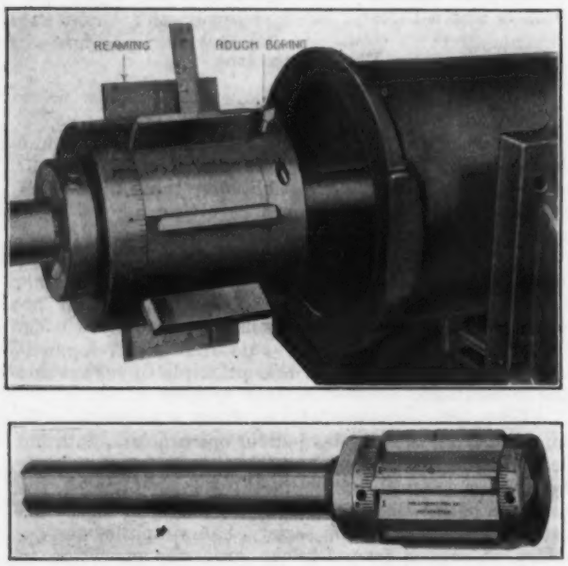
Three papers devoted to tin were presented in succession. One was entitled "Electrolytic Tin," by Charles I. Mantell, electrochemical laboratory, Columbia University, New York, which discusses various electrolytic

(*Continued on page* 1327)

New Line of Expanding and Bore Reamers

A new line of expansion reamers and bore reamers, the latter a combination of boring head and reamer, has been brought out by the Lambert Tool Co., East Fifty-fifth Street and Euclid Avenue, Cleveland. These tools are available in sizes of from 1 to 20 in. or larger if desired and the expansion increases with the size and according to the type of the tool. The 1-in. tool has an expansion of ¼-in., the 3-in. tool an expansion of 1 in. and the larger an expansion up to 5 to 6 in. It is claimed that with a maximum expansion the tool is perfectly rigid.

Expansion is accomplished easily and quickly. This is done by loosening a lock nut and turning simultaneously with a special wrench two graduated scrolls at either end of the barrel, the threaded ends of the blades fitting into the scrolls. When the proper size is reached the lock nut is tightened. This tool can be adjusted to within 0.001 in. limits. As the scrolls are independent of each other, the blades can be adjusted independently, giving the tool a slight taper at either end. The blades are numbered and are set in corresponding numbers in the slots. The blades are of high speed steel and have a lead at each end so that the tool can be used either to push or draw. The tool barrel is at all times a fixture with the bar, assuring a permanent setting. Heads for rough boring carry three tools and are mounted on a permanent head built into the tool.



The 9-12 In. Expanding Bore Reamer Mounted on a 3-In. Bar Is Shown in the Upper Illustration. The machine reamer is shown in the lower illustration

The tools are built in various sizes and style, either mounted on a bar shank or unmounted, so that users can fit them on their own or standard boring bars.

One illustration shows a 9-in. bore reamer expanding to 12 in. mounted on a 3-in. bar with which it is stated an operator was able to bore a cylinder 9 in. in diameter by 32 in. long in 1 hr. Three roughing tools removed the stock in 40 min. and reaming required 20 min. A reamer for use on the average machine is shown in the separate illustration.

New Open-Hearth Furnace Construction

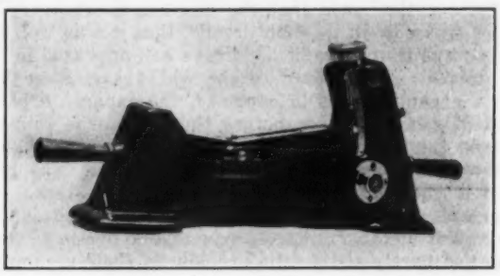
In its publication the *Commonwealther*, the Commonwealth Steel Co. refers to its new 40-ton open-hearth furnace at Granite City, Ill., which made its first heat on March 31. The furnace is 54 ft. long over all and 14 ft. wide. The hearth is 28 ft. long and the port ends are 13 ft. wide, 22 ft. long and 16 ft. deep. The furnace has a 135-ft. stack 5 ft. inside diameter. "One of the unusual features in the construction of this furnace is the fact that the regenerator chambers have been cast in concrete, the buckstays being also cast into the concrete. The walls, the floor and the arching of the furnace are insulated with a 4½-in. lining of sil-o-cel brick, a very effective insulating material found on the Pacific Coast, where it is mined from ancient deposits, the brick being cut out from this formation in solid blocks. This sil-o-cel brick insulation is very effective in confining the heat. The same insulation is used not only in the regenerator chambers, but also in the flues to the stack. The whole lower construction of the furnace is insulated up to the level of the furnace floor."

Precision Level of 30 Degree Range for Setting Machine Beds

The precision machine level of 30 deg. range shown in the accompanying illustration is being placed on the American market by the R. Y. Ferner Co., 1410 H Street, N. W., Washington, the Société Genevoise d'Instruments de Physique, Geneva, Switzerland, being the manufacturer.

The instrument is intended for use in leveling up the beds of machinery, as well as for measuring the tilt of work tables when used for angular work. It may be used also for measuring the angle obtained on jobs calling for inclined surfaces, within the range of the instrument.

The instrument is made up of a heavy cast-iron base with machined lower surface, in which is pivotally mounted a graduated level vial. The tilting of the latter in the vertical plane is accomplished by a worm screw working in an accurate sector rack having teeth spaced at half-degree intervals. The position of the vial at any point is read on a sector scale graduated to half degrees and on the micrometer head at the end of the worm screw, at the top of the instrument, which is graduated to 10-second intervals, having 180 divisions for the 30 minutes covered by a single rotation of the head. The instrument is adjusted so that when the base is horizontal and the bubble of the level is between the central graduations on the vial, the indexes on the graduated sector and the micrometer head both read zero. When placed on a tilted surface its angle with the horizontal plane may be measured by operation of the micrometer head until the bubble of the vial again rests between the central graduations. It is claimed that the level vial is sensitive to 6 seconds of arc per division.



Precision Instrument for Measuring Amount a Surface Is Out of Level. It is intended for use in leveling beds of machines and other shop uses

The base of the instrument, which is 80 by 430 mm. (3.15 in. x 17 in.), has four machined bearing surfaces at the four corners, each 20 by 100 mm. (0.8 in. x 4 in.). The handles shown at each end are for convenience in lifting and carrying the apparatus. The weight of the instrument is approximately 20 lb.

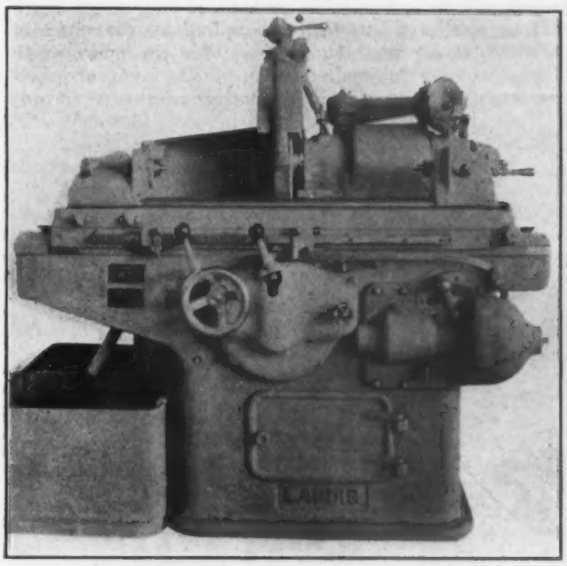
The American Society of Civil Engineers will hold its annual convention in Cincinnati next year, during the week of April 20. This was decided upon at a meeting of the Cincinnati section, at which the national officers of the society were present. The visiting officers were the guests of the Cincinnati section at a dinner, and afterwards addressed the members on the affairs of the society.

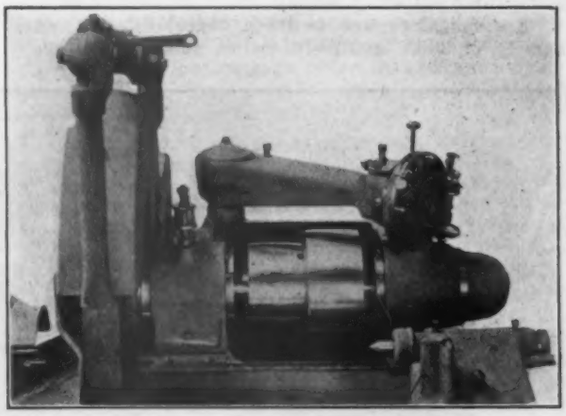
IMPROVED HYDRAULIC GRINDER

High Production Unit for Small Work—Wheel Head Stationary—24-In. Wheel Employed

A new high traverse plain grinding machine, designed primarily for use on small work up to 1½ in. in diameter, and for which unusually high production is claimed, together with accuracy and high quality of finish, has been brought out by the Landis Tool Co., Waynesboro, Pa. Two sizes of the machine, 6 x 20 in. and 6 x 30 in., are available.

The machine represents a departure from the company's usual design in that the grinding wheel head is held stationary, while the work carriage is traversed. The machine carries a larger diameter grinding wheel, 24 in., with a correspondingly heavy wheel head, and because of this it was considered advisable to traverse the lighter weight, which in the case of this machine is the work carriage. The carriage is carried on two Vee guides with chilled surfaces, a construction intended to assure alinement regardless of the traverse speed. These guide bearings are adequately protected from grit and water, and are lubricated from oil reservoirs with rollers located at intervals in the bed.





Plain Grinder With Hydraulic Drive for Traversing Work Carriage. Speeds from 6 in. to 40 ft. per min. are available, and high production is claimed. A 24-in. grinding wheel is used. The proportions of the wheel head may be noted from the detail view

A special hydaulic drive provides power for traversing the work carriage. Speeds ranging from 6 in. to 40 ft. per min. are available, being controlled by a regulating valve conveniently located at the front of the machine. The oil pressure is applied in the oil cylinder through a leverage arrangement which increases the power applied to the traversing carriage, thus permitting a much lower oil pressure, this in turn eliminating the need of excessive packing around the valves and joints. The reversing valve is of the balanced-piston type, and is constructed so that smooth motion is transmitted to the carriage at all speeds. A device is incorporated in the reversing mechanism to permit reversal at the highest speed without shock or vibration to the carriage. The starting and stopping lever at the extreme left-hand is connected to the control valve, a slight movement of this lever permitting control of the traverse by hand, and stopping it entirely without stopping the work, if desired. Oil pressure is provided by a geared pump driven from the rear drive shaft. The base of the machine forms a reservoir for the oil, which is intended not only to eliminate an extra tank but to add weight and stability to the machine.

Works speeds ranging from 150 to 800 r.p.m. are obtainable by shifting a conveniently located operating lever. This lever operates a shifting key through a series of silent chain sprockets running in oil, and it is claimed that speeds may be obtained instantly. The entire speed change mechanism is contained in a single unit, which is driven by belt from the rear drive shaft.

A departure from accepted practice is the use of a 24-in. grinding wheel, an 18-in. wheel being usually considered as the maximum on machines used for small work. It is claimed that tests have proved that the greater number of pieces ground per dressing of the wheel more than offset the higher initial wheel cost. As compared to a machine using a 16-in. wheel and obtaining 400 pieces per dressing of the wheel, the new machine in one instance is claimed to have averaged 900 pieces per dressing, it being further claimed that the latter had frequently ground 1200 pieces with a single dressing. An increase in production of 25 to 35 per cent over the machine equipped with the smaller grinding wheel is also claimed.

The grinding wheel head has been designed especially to accommodate the large wheels, the bearings being said to be of a length and diameter to provide rigid support and spaced to assure continuous alinement. The wheel spindle is driven by a two-step cone pulley and an automatic belt tightener is provided. The proportions of the wheel head may be noted in the insert illustration. The grinding wheel feed is either automatic or by hand and the feed-up mechanism is the same as in previous Landis machines.

The machine may be arranged for either lineshaft or direct motor drive. For motor drive the motor is connected to rear drive shaft through a flexible coupling.

Bethlehem Diesel Engine Discussed

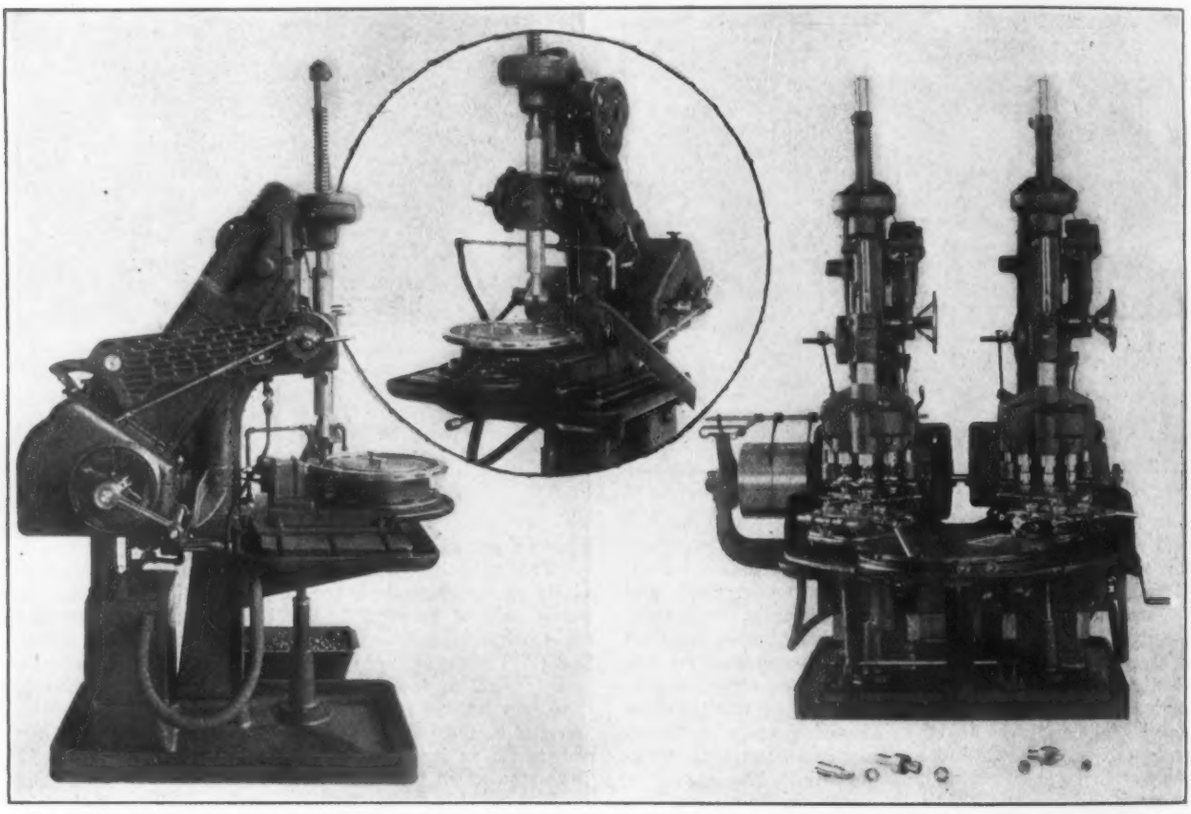
At a meeting of the Philadelphia section of the American Society of Mechanical Engineers held Tuesday evening, April 22, G. A. Richardson, of the Bethlehem Steel Co. and the Bethlehem Shipbuilding Corporation, Ltd., gave a talk on the new Bethlehem two-cycle Diesel type oil engine. In the course of the address he gave the first public showing of a four-reel film featuring details of the engine, which is designed not only for marine use but also for use in large land plants. The ease with which the engine can be maneuvered (being brought from full speed ahead to full speed astern in 7 sec.), the accessibility of the various parts for repairs and inspections and the simplicity of the engine as an operating unit were all brought out. Many of the operations depicted could not well be seen in any other way so far as the average person is concerned because the engine would have to be shut down and parts taken out specially. The removal of the fuel oil valve and its replacement with a new one in 20 min. time; the taking out and replacement of the complete valve cage in a total time of 40 min., and the operation of getting at the piston rings for inspection and also the removal of the piston itself from the crank case were included.

ADDS FULL AUTOMATICS

Barnes Drill Co. Brings Out New Drill and Tapper with Self-Indexing Work Table

Fully automatic drilling and tapping machines with self-indexing jigs or work table have been brought out by the Barnes Drill Co., Rockford, Ill. In them are incorporated the essential elements of the all-geared self-oiled construction of the company's drilling machines, but in addition the new machines have full automatic spindle action, with all that this means toward high production. There is provided mechanical means for automatic rapid approach of spindle, automatic feed engagement, automatic feed trip and automatic rapid return of spindle.

The machines are built in three different sizes, namely, of 20-in. and 24-in. swing, and in 22-in. heavy duty size, all in drilling style, tapping style, or combined drilling and tapping construction. The machine shown in the circle is the No. 205 (20-in. swing) automatic tapper with a 20-position self-indexing work table, arranged for tapping and automatically ejecting conduit bushings. It has geared thread leading feed to the pitch of tap used. Its production rate approaches 25 pieces per minute, depending upon size of work and number of threads required; that is, the depth of feed. Mention may be made of the square column construction, and the size of table and coolant pump attachment.



Drilling or Tapping or Both May Be Done Automatically on These Machines, Leaving for the Operator Only the Loading of the Self-Indexing Work Table

The photograph reproduced at the left of the group shows the No. 245 automatic drilling machine with 20-position self-indexing work table, provided with self-closing jaws securely holding the work at the machining station by means of roller closer for the outer jaw. As the table rotates past the tool, jaws automatically release, permitting the ejector to kick out the finished piece. The operator has only to keep the stations filled with blanks—the rest is automatic, because at the moment the tool lifts out of the work, the table indexes and the spindle again automatically approaches and enters the work. The self-indexing work table may also be furnished with 10 stations instead of 20.

The third illustration is a view of the two-spindle No. 222 automatic gang, equipped for fast production on relatively heavy work, such as three parts of malleable iron unions. For example, each main spindle is fitted with a four-spindle auxiliary head and there is a four-station hand indexing rotating work table serving both heads. For all two-operation work, such as the union nuts, four pieces are bored under the first head and simultaneously four pieces are tapped under the second head, while the operator reloads at least one of the spare stations. Thus, the loading time and tapping time are free. The work table is then indexed one-quarter way around and operations repeated. Less than two seconds are required to index, the fixture rotating on ball bearings, and at the instant the fixture locates under the spindles, the tools automatically approach and enter the work. When predetermined depth of feed has been reached, the spindles automatically return to upper position and wait for the operator to index the fixture, whereupon another complete cycle progresses.

For single operation work, such as pipe ends of unions, eight pieces are tapped simultaneously, with the reloading of the two spare stations, and the work table is then indexed 180 deg. Facing operations may also be accomplished automatically by means of the so-called "Dwell" mechanism that the company can embody in the machine.

Motor truck feeding of steam railroad freight transportation appears to be rapidly expanding. Five trucking zones have been established by the New York Central Railroad in western New York. The trucks are not owned by the railroad but instead contracts are made with motor truck haulage companies. At Buffalo alone 28 tractors, trucks and trailers are employed.

A bulletin announcing courses in chemical and metallurgical engineering and graduate courses has been issued by the University of Michigan. Quarters in the new east engineering building, where 75 rooms with 60,000 sq. ft. of floor space are devoted wholly to chemical and metallurgical engineering, are now in use. The special laboratories contain some rather unusual facilities, which are described in the bulletin.

Production Controlled by Estimating Sales

Master Planning Methods of Walworth Mfg. Co. Described at Taylor Society Meeting—Industrial Psychology and Other Management Subjects Discussed

PRECISE general control—master planning which coordinates sales, finance and production—as developed by the Walworth Mfg. Co., Boston, one of the pioneers in this extension of scientific management, was ably described by Joseph H. Barber, staff assistant to the president of that company, at a meeting of the Taylor Society, held in Boston, April 24 to 26. Mr. Barber's paper outlined the methods of his company in the current and continuous forecasting of demand and consequent adjustment of inventory and production.

The meeting was held in cooperation with the New England section of the society and under the auspices of the Harvard University Graduate School of Business Administration, the College of Business Administration of Boston University and the Massachusetts Institute of Technology, sessions being held at all of these institutions. Among other papers that stimulated interest and discussion was that of Dr. H. S. Person, managing director of the society, on "Industrial Psychology —A Layman Asks Some Questions."

The master planning developed by the Walworth company had its beginnings some six or seven years ago. All adjustments and revisions of the company's previous activities had in view the ultimate statistical control of a large, extended and complicated manufacturing and distributing corporation.

The product sold by the company comprises some 23,000 items, nearly all of which are intended to be carried in stock. Of these 23,000 items, 17,000 are manufactured in the company's plants, and of the 17,000 a small group of only 600 items comprise two-thirds of the full tonnage demand.

There are two plants of 50,000 tons per year combined capacity, one plant at South Boston, Mass., and the other at Kewanee, Ill. Somewhat attached to each of these plants are two divisions, the Eastern and Western. Other selling units, designated as branches, and which carry stock, are located in various large cities. One other form of selling unit is the Walworth International Co., Bush Terminal, New York, which has a selling organization of its own, having branches in many cities throughout the world and sales agencies in many more.

The organization of the company is in accordance with the accepted principles governing functional control. There are four vice-presidents, one each in charge of production, sales, administration and engineering. To aid in the coordination of the activities in charge of the various vice-presidents, there is an advisory committee, indicated as a staff to the president. This committee is made up of the vice-presidents and the treasurer, with the clerk of the corporation as its secretary, and the president as its chairman. Such a body aims to bring together many-sided interests, experiences, and judgments for guiding the president's decisions in solution of the major problems of the business. This "meeting of many minds" is said to be directly utilized in the master planning control of sales and production.

Development of Master Planning Outlined

The organization of the company in this manner was to enable the devising of an accounting system which should hold each executive financially responsible for all the activities within his jurisdiction. The next development was the introduction in 1920 of a planning and statistical section in staff capacity attached to the president's office. At its inception, this section was intended to gather currently and continuously the pertinent facts of the business, much as the statistical section of any company serves its major officers. The reports compiled were statistical in nature, rather than precise accounting reports, and were issued within 10 days after the close of the month, which would precede the audited reports by some 15 or 20 days.

Subsequently, as the need was felt for further advance information, a monthly financial budget was instituted and placed under the control of this established staff section. Methods were later developed to enable determination of the probable future course of the many activities of the business, in order that, when budgets were calculated, they would have a sound basis of probability as to their execution.

Difficulties in the Problem of Forecasting

At the beginning two axioms were connected. First, that the business was a staple bread-and-butter business, and, second, that bread-and-butter businesses usually had a normal continuous flow of demand. It is still felt to be true that most staple bread-and-butter businesses have a fairly consistent, continuous normal demand in all years. The feeling was shared that the only reason orders did not come in, in such a continuous flow of demand, was that some accidental, unforseeable circumstances were constantly occurring to upset the normal flow and that a bad, erratic situation simply had to be made the best of.

The large number of items in the company's line presented an initial difficulty. To review only part of the detail order would cover records of the thousands of items carried on finished-stock balance-of-stores cards. Even a summary of the annual totals of demand over a period of years for a group of items seemed to suggest no consistent individual or combined action in the time, extent or assortment of variations in demand. Most summaries seemed to be simply a heterogeneous mass of data, meaningless as to any valuable implications concerning the future. Even considering the grand total of all this detail it was said that there are still some startling variations.

It was evident that there would be almost inconceivable detail involved in analyzing the possible variations of any one of the 23,000 items. For the purposes of cost accounting, a grouping of many items into one product-class had been made upon a rational basis for the purpose intended, and this cost grouping has been found acceptable for the purpose of statistical analysis. Many statistical control rules which can be applied logically to these individual product-classes were developed and these findings are being utilized, in an inventory and production control.

Factors Causing Variation in Demand Studied

In the first attempt to analyze these figures it was recognized that there must of necessity be definite contributing factors as causes of variation. The first cause suggesting itself was "seasonal variations," variations which would occur within any calendar year. It was felt that if these seasonal variations could be studied, and their effect eliminated from the raw demand figures, the residue set of figures would reflect all other causes than seasonal.

The second factor discussed as causing variation in demand was the business cycle. It was pointed out that economists held this cause should be consistently evidenced in individual businesses; that every industry, in turn, to some extent at least, felt the effect of the business cycles of general business the country over. Each industry, therefore, pursued a cycle of its own. If this business cycle for the individual company could be discovered and related to the business cycle of the country in general, there would be, Mr. Barber pointed out, a considerable advantage to the administrator of the in-

(*Continued on page* 1329)

Program of Sheet Steel White Sulphur Meeting

The program has been issued for the second annual meeting of the executives of sheet steel manufacturers to be held this year, as was that of a year ago, at Hotel Greenbrier, White Sulphur Springs, W. Va., May 12 to 15, inclusive. Business sessions are to be held on the mornings of May 13, 14 and 15, with the afternoons to be given over to recreation, principally golf.

Addresses to be given at the session of Tuesday morning May 13, fall under the general heading of administration. Severn P. Ker, president Sharon Steel Hoop Co., Sharon, Pa., is chairman of this meeting, and the addresses include, "The Sheet Steel Industry," by W. S. Horner, president National Association Sheet and Tin Plate Manufacturers, Pittsburgh; "Executive Responsibility," by James A. Campbell, president Youngstown Sheet & Tube Co., Youngstown; "Industrial Stability," by George M. Verity, president American Rolling Mill Co., Middletown, Ohio; "The Relation of Administration to Operation," by Clayton L. Patterson, secretary Labor Bureau, National Association Sheet and Tin Plate Manufacturers, Pittsburgh, and "Economic Factors and Administration of Industry," by Leslie M. Vickers, National Industrial Conference Board, New York.

Walter C. Carroll, vice-president Inland Steel Co., Chicago, will be chairman at the business session of Wednesday, when the addresses will converge upon the general subject of distribution. "Economy and Elimination of Waste in Sheet Steel Industry," will be the subject of A. E. Foote, Department of Commerce, Washington, to be followed by a discussion of "Feasibility and Advantage of Trade Promotion Through United Effort." "Is the Trade Extension Plan Legal?" is the question to be answered by T. D. McCloskey, general counsel National Association of Sheet and Tin Plate Manufacturers. Murray Springer, executive vice-president, Crosby, Chicago; G. H. Charls, vice-president United Alloy Steel Corporation, Canton, Ohio; W. U. Follansbee, president Follansbee Brothers Co., Pittsburgh, and Severn P. Ker also are scheduled for addresses. The final business of this session will be a decision on the trade extension plan, which has been under consideration for the past year.

Production is the general heading of the session for Thursday morning at which Charles R. Hook, vice-president and general manager American Rolling Mill Co., will preside. "Factors Influencing Labor Stability," is the general subject, and the addresses include, "Labor Supply," by Cyrus S. Ching, supervisor of industrial relations United States Rubber Co., New York; "Better Understanding Between Management and Men," by James M. Larkin, assistant to the president Bethlehem Steel Co., Bethlehem, Pa.; "The Development of Labor Saving Machinery in the Steel Industry," by G. H. Charls, vice-president and general manager United Alloy Steel Corporation, Canton, Ohio, and "Public Policy and Production," by James A. Emery, general counsel National Manufacturers Association, Washington.

COMING MEETINGS

May

Iron and Steel Institute (British). May 8 and 9. Annual meeting at the Institution of Civil Engineers, London. G. C. Lloyd, 28 Victoria Street, London, secretary.

National Association of Sheet and Tin Plate Manufacturers. May 12 to 15. Second annual convention, Hotel Greenbrier, White Sulphur Springs, W. Va. W. W. Lower, 1832 Oliver Building, Pittsburgh, secretary.

American Iron and Steel and Heavy Hardware Association. May 13 to 15. Annual convention, Westchester-Biltmore Country Club, Rye, N. Y. George F. Greene, Marbridge Building, New York, secretary-treasurer.

National Supply and Machinery Dealers' Association, American Supply and Machinery Manufacturers' Association and Southern Supply and Machinery Dealers' Association. May 19 to 21. Triple convention at Hotel Cleveland, Cleveland.

National Association of Purchasing Agents. May 19 to 23. Annual convention, Mechanics Hall, Boston. W. L. Chandler, 19 Park Place, New York, secretary.

American Society for Steel Treating. May 22 and 23. Spring sectional meeting, Hotel LeClaire, Moline, Ill. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, secretary.

National Pipe and Supply Association. May 22 and 23. Annual meeting Hotel Cleveland, Cleveland. George L. McIlvaine, 909 Oliver Building, Pittsburgh, secretary.

American Iron and Steel Institute. May 23. Hotel Commodore, New York. E. A. S. Clarke, 40 Rector Street, New York, secretary.

American Society of Mechanical Engineers. May 26 to 29. Spring meeting, Hotel Cleveland, Cleveland. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

Meeting of Oil Burner Makers

At the first annual meeting of the American Association of Oil Burner Manufacturers, held in St. Louis, the following officers were elected for the coming year:

President—Edward P. Bailey, National Air-Oil Burner Co., Philadelphia.

Vice-Presidents—Ernest H. Peabody, Peabody Engineering Corporation, New York; L. P. Ordway, Jr., Winslow Boiler & Engineering Co., Chicago; A. M. Lockett, A. M. Lockett Co., Ltd., New Orleans; J. L. Voorheis, Coen Co., San Francisco; Lionel L. Jacobs, Fess Oil Burners of Canada, Ltd., Toronto, Canada.

Directors—Wallace C. Capen, Home Appliance Corporation, St. Louis; C. H. Chalmers, Chalmers Oil Burner Co., Minneapolis; R. P. Flower, Gill Mfg. Co., Chicago; John Scheminger, Jr., Aetna Automatic Oil Burner Co., Providence, R. I.; H. A. Tiffany, Subrasco-Tiffany Oil Burner Co., Paterson, N. J.

By vote of the board of directors an executive committee consisting of two members of the board and the secretary, L. D. Becker, 518 Bank of Galesburg Building, Galesburg, Ill., was elected to serve for one year. Committee chairmen appointed include the following: On Simplification and Nomenclature, Arthur E. Shaw, Pennsylvania Rotary Globe Oil Burner Co., Philadelphia. On Research Committee, James L. Breese, Jr., Breese Engineering Co., Chicago. On Underwriters Standards, J. H. Hirsch, Automatic Burner Corporation, Chicago. On Oil Fuel Supply, Richard Wotowitch, Henry L. Doherty & Co., New York. On Cooperation with Boiler and Furnace Manufacturers, Homer Linn, American Radiator Co., Chicago. A special committee was appointed at the request of the Western Petroleum Refiners' Association to cooperate in a series of tests on domestic oil burners to be conducted at the Bartlesville, Okla., experiment station of the Bureau of Mines, with P. S. Russel, Home Appliance Corporation, St. Louis, as chairman.

New members include: S. T. Johnson Co., 940 Arlington Street, Oakland, Cal.; J. C. Johnson, president Hardinge Brothers, Inc., 1770 Berteau Avenue, Chicago; W. N. Horner, Mahr Mfg. Co., Minneapolis; Basel Mfg. Co., 911 Mulberry Street, Kansas City; E. A. Basel, president Wagner Electric Corporation, 6400 Plymouth Avenue, St. Louis; Thomas T. Richards, vice-president Jannette Mfg. Co., Chicago.

The First International Management Congress, to be held at Prague, Czechoslovakia, July 21 to 24 inclusive, has secured the help of various American engineering and management associations to the extent that a committee on American participation has been organized with headquarters at the Engineering Societies Building, 29 West Thirty-ninth Street, New York. The committee has prepared a pamphlet covering the subjects to be discussed and the several itineraries which have been planned in connection with the congress.

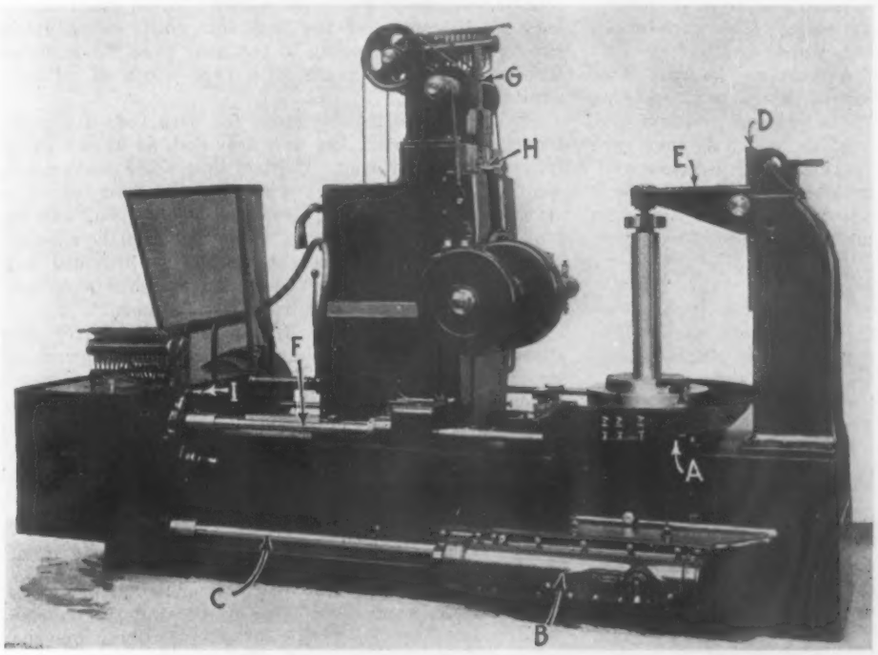
GEAR HOBBER WITH WIDE RANGE

Universal Machine for Gears Up to 72 In.—Drive Gearing Segregated—Stanchion Adjustable

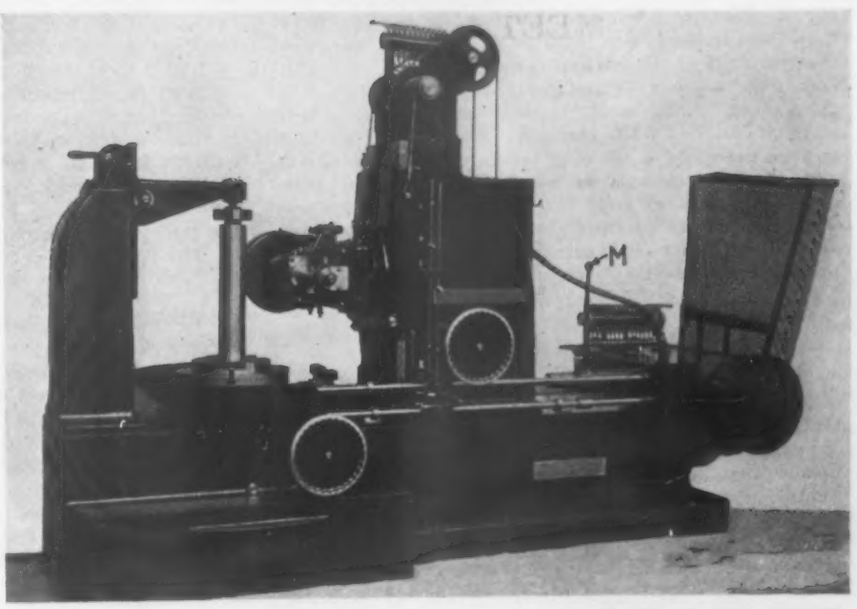
A gear hobbing machine adapted to the cutting of gears up to 72 in. in diameter and incorporating improved features is shown in the accompanying illustrations.

The machine, developed recently by Gould & Eberhardt, Newark, N. J., and designated as the No. 72-H, is of the universal type arranged for hobbing automatically spur, helical, herringbone and worm gears. Spur and helical gears and worms may also be milled by means of a semi-automatic disk cutter attachment incorporated in the basic design of the machine. The machine is rated to cut up to 1½ diametral pitch in cast iron, or 2 d.p. in steel. Coarser pitches may be cut by taking roughing and finishing cuts.

What is considered an outstanding improvement is the segregation and assembling in a case of all of the drive, feed and differential gearing. The case is bolted to the rear of the bed of the machine. An advantage of this arrangement is the accessibility of the gearing, since the removal of the cover exposes the entire mechanism. Simplicity in manufacturing is also emphasized, it being said that the case may be machined more easily and accurately as a separate unit; it facilitates assembling and permits the incorporation of automatic gravity system of lubrication. From the gear case the drive shafts for the work and cutter spindles, the feed shafts for cutter carriage and stanchion, and the various control rods, all extend along the bed of the machine. The change gears for cutter speed, index, feed and lead are located outside of the case, but are entirely inclosed by guards.



Automatic Gear Hobber for Spur, Helical, Herringbone and Worm Gears. Spur and helical gears and worms may be milled by means of a semi-automatic attachment incorporated



Drive, Feed and Differential Gearing Are in the Case Bolted to the Rear End of the Bed. These gears are made directly accessible by removing the cover of the case. This arrangement also permits automatic gravity lubrication

Another feature of the machine is the adjustable type of stanchion arranged to slide on machined ways on the bed. This design is intended to permit of using an unusually long, slightly tapered work spindle, which is mounted in a large taper bearing. The bearing is not held in the frame, but in the heavy casting shown at *A* in the rear view illustration, which is bolted and doweled to the bed.

The index worm wheel at the bottom of the spindle is 48 in. in diameter and is machined from chilled semi-steel. The worm which drives it is of steel, hardened and ground, and is mounted on a short shaft inside of

the casing, shown at *B*. The worm shaft is geared to the longitudinal index shaft *C* which passes through the gear case and is driven by change gears. Gears with from 8 to 99 teeth, including the prime numbers, and from 100 to 312, excluding the prime numbers, may be cut. Having the worm wheel in the base of the machine instead of on the top of the bed, is emphasized as making possible the use of a worm wheel of much larger diameter than usual, at the same time permitting the machine to be used on small diameter pinions without having undue overhang of the cutter slide.

The spindle is provided with a 10-in. hole from end to end, to permit of machining gears that are integral with long shafts, which may extend through the floor if necessary. The diameter of the work spindle head is 21 in. and an auxiliary face plate 36 in. in diameter is provided for large diameter gears. The work mandrel provided is supported at its upper end by the box-section stanchion-type outer support as shown. The bearing *D* is guided on the face of the support and the casting *E* is counterweighted. In changing blanks the arm is moved up to the face of *D*, which is then unclamped and swung around, carrying the bearing and giving access to the top of the mandrel. The outboard support may be used when cutting gears up to 36 in. in diameter, the support being moved as an unit for larger gears.

The cutter spindle is mounted in substantial bearings on the swiveled section of the cutter carriage, the bearings having independent adjustments for radial wear and end play. The outer or arbor bearing may be removed for mounting the cutter. Both bearings may be moved in an axial direction, a rack and pinion being provided to move the heavy inner spindle bearing which takes the thrust. This arrangement is emphasized as especially valuable as a means for quickly centering the cutter or hob. A locating gage in a hole at the center of the carriage is intended as a further aid in alinement.

The standard cutter arbor is 1½ in. in diameter, although larger sizes may be used. The maximum diameter of hob which can be mounted is 11 in., and the maximum length, 16 in. The spindle is driven through herringbone gears from a parallel shaft, the gears being mounted in bearings and splined to the spindle so that the spindle is not required to resist the thrust of the gears. A 16 in. flywheel is mounted on a stud at the end of the swivel slide and is driven by spur gears from the parallel shaft, so that it will rotate faster than if attached to the cutter spindle. The parallel shaft is in turn driven by a series of shafts and bevel gears inside the stanchion from the horizontal cutter drive shaft *F*. This shaft extends through the gear case and is driven through change gears which provide 10 cutter speeds ranging from 20 to 97 r.p.m. The pulley shaft of the machine drives the change-gear shaft through a reversing clutch, providing for changing the direction of the cutter rotation.

The required angular position of the hob is obtained by rotating the swiveling portion of the carriage, a worm and gear being provided for this purpose. The carriage has long guide bearings on the face of the stanchion and the ways are of rectangular section. The carriage is provided with gibs. The feed screw *G* is fastened solidly in the carriage, the feed nut *H* being mounted in the stanchion at the top of the ways, where it is driven by a worm.

The carriage has rapid power traverse in both directions in addition to the power feed for cutting. A total of 10 cutter feeds are available and range from 0.01 to 0.15 in. per revolution of work spindle. The feed nut receives its power from a longitudinal shaft located between the ways of the bed, this shaft being driven through the feed gearing in the gear case. A sufficient feeding length for gears with face width of 20 in. is available.

Fixed and adjustable stops for both feed and power traverse of the carriage are provided, as shown in the front view illustration. Control levers are conveniently located and are interlocked so that the feed cannot be started until the rapid traverse is stopped, and the traverse cannot be started while the feed is engaged. The carriage counterweight system is provided with differential type pulleys, the counterweights being comparatively light and requiring little space.

The index shaft *C* is driven from the cutter drive shaft in the gear case and, for hobbing spur gears and worm wheels, directly through the index change gears. When cutting helical teeth the proper setting of a clutch causes a miter gear differential to be introduced into the train. The casing of the differential has worm wheel teeth on its periphery and is rotated by a worm which is, in turn, driven through change gears from the cutter feed shaft. This gives the required lead for helical teeth. The cutter and index drive gears are of alloy steel and heat treated.

When employing the disk cutter attachment for milling teeth, a proper setting of the index clutch and manipulation of the handle *I*, after shifting one gear on the shaft *C* just inside the gear case, allows the indexing of the work by hand for each tooth. The automatic cutter feed is used, and the proper lead for disk-cutting helical teeth may be obtained automatically through the differential.

The machine is driven by a 16 in. x 4½ in. pulley through a friction clutch, which is controlled by the ball end lever *M*. The coolant pump is geared directly to the pulley shaft. For motor drive, a 15 hp. motor may be mounted on a bracket and arranged to drive the pulley shaft through a silent chain.

The floor space required by the machine is 60 x 150 in. The net weight is approximately 18,000 lb.

Marks to Install Pipe Mill

Clayton Mark, formerly chairman of the board, Steel & Tube Co of America, Chicago, and his brother, Anson Mark, who was also prominently identified with that company, have purchased from the Ashland Industries Corporation that part of its industrial operating plant located west of Lincoln Street on Seventy-fourth Street, Chicago. This section of the former Symington ordnance plant contains two large buildings and considerable vacant land. Here the Marks are installing two butt-weld pipe mills and equipment for the manufacture of conduit, nipples, and water well supplies, the line of business they were previously engaged in. Details regarding the organization and manufacturing plans will be announced later.

The former Symington ordnance plant, a large section of which was bought by the Marks, was originally purchased from the Government by the Ashland Industries Corporation and extends from the corner of Seventy-fourth Street and Ashland Avenue, Chicago, embracing 47 acres of land containing various modern manufacturing buildings, with over 750,000 sq. ft. of one-story floor space. The works was organized by the Ashland company as a modern manufacturing district, and the following companies have located in it: Western Electric Co, occupying 160,000 sq. ft. of space; Beckwith Iron Co., occupying 30,000 sq. ft.; Aztec Iron Co., 30,000 sq. ft.; Harvey Metal Corporation, 30,000 sq. ft.; Winkler & Reichmann Co., 50,000 sq. ft.; Stetson China Co., 35,000 sq. ft.; Machinery Warehouse Co., 25,000 sq. ft.; Harris Bros. Co., 25,000 sq. ft.; Scott Mfg. Co., 15,000 sq. ft.; Miles Piston Ring Co., 10,000 sq. ft.; Leonard Machine Tool Co., 12,000 sq. ft.; Cuneo-Hanneberry Co, 40,000 sq. ft., and several other companies.

This district is served by the Chicago Belt Line and Pennsylvania Railroad.

President Valentine Resigns

Joseph F. Valentine, president of the International Molders' Union of North America, with headquarters at Cincinnati, has resigned, as a result of ill health preventing him giving his full strength to the work of his office. Mr. Valentine has been president of the Molders' Union for the past 20 years, and the executive board, in accepting his resignation, took steps to present to the membership for a referendum vote the question of paying him half his salary for the remainder of his life as a reward for his services. Michael J. Keogh, first vice-president, will succeed Mr. Valentine.

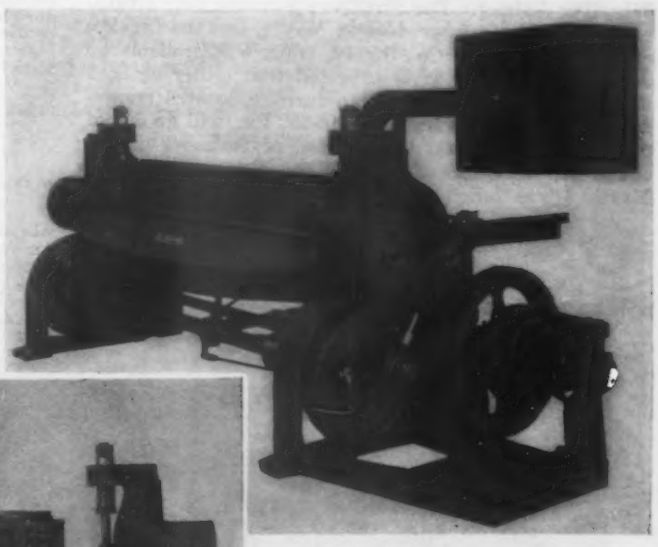
POWER FOLDER AND BRAKE

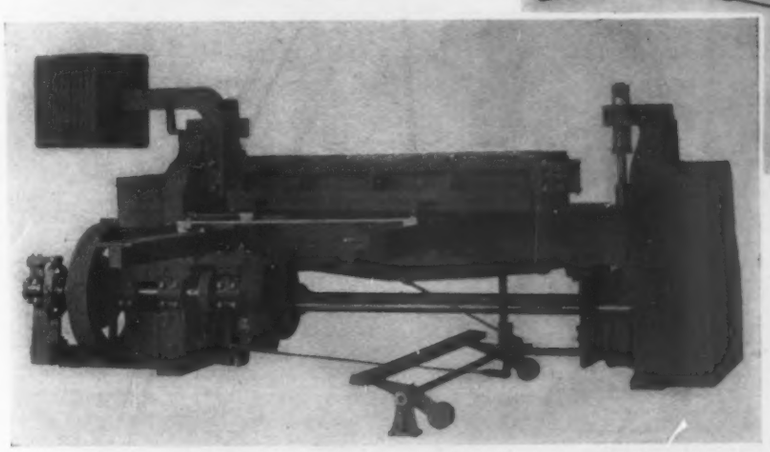
Working Length 72 In.—Makes Square Pipe of One Sheet

The Niagara Machine & Tool Works has placed on the market an unusual power folder and brake. It has a working length of 72 in., for No. 14 gage sheet metal and lighter. A sheet can be bent to right angles at any distance from the edge, or a 30-deg. acute angle bend can be made along the edge of the sheet. Successive bends can be made to form the sheet into closed bodies such as box or square pipe. The sheet is fed into the folder and rapidly gaged as one bend after the other is made.

The machine is especially adapted to the manufacture of ice cans. Cans in which manufactured ice is frozen formerly had the body made in two pieces. On this folder it is possible to form the body of the can from a single sheet.

The sheet to be folded is placed on the front brackets and instantly gaged. The operator steps on the treadle which actuates the clutch. The clamping bar comes down and grips the sheets. The folding bar swings up and back, making the desired bend, and the clamping bar returns to its upper position. The action is automatic and the operation convenient. Thus the first fold is completed. This operation is repeated four times for making square or rectangular pipe such as an ice can, completely closed in on all four sides. The work is removed from the machine without being distorted.





Front View (Left), Showing Where Sheet Is Fed In and Gaged. Above is the back, showing the operating gears

Box pipe as small as 11 in. square can be formed from the flat sheet, and removed from the folder without springing or altering the shape of the pipe. The work is held in place by the automatic action of the clamping bar, which grips the sheet firmly while the folding bar swings over and folds the sheet to the desired angle.

Gages best adapted to the work to be done can be furnished with the folder. In the case of the folder for ice can work, a bar provided with two gripping jaws acts as a handle and facilitates the feeding of the sheet into the folder. This bar is guided by grooves cut in steel blocks which are adjustable along the gage brackets. The taper of the can is also taken care of by this method of gaging. The motion is controlled by a friction clutch, actuated by a long foot treadle, extending out from the front of the machine. This treadle is located just to the right of the aisle between the two front gage brackets, where it is handy for the operator to trip.

The drive is double back geared, with all gears made of semi steel and the pinions of steel. The machine shown was arranged for individual geared motor drive. The clamping bar is a steel casting in which the metal has been distributed to give it the greatest possible rigidity for its size. It is guided at both ends by large steel posts that move in brass bushed bearings. The bar is automatically moved up and down by toggle links, operated by cams on the main shaft, the action being properly timed with the action of the folding bar.

The left end of the clamping bar is pivoted about the guide post and so arranged that the right end can be swung out to permit removing the work formed around it. A single latch at the right hand guide post makes it possible for the operator to unlock and open the bar. This bar is counterbalanced and the left post is supported by ball and roller bearings, practically no exertion, therefore, being required to swing it out. When swung back into place, it locks itself into position. An adjustment is provided for regulating the pressure of the clamping bar on the sheet.

A safety device prevents throwing the clutch in, when the clamping bar is open, thus to make it impossible to depress the treadle until the bar is locked in place. The clamping blade and folding blade can both be designed to suit special work. The folding bar, which is also a steel casting, is actuated by twin segment gears on each end of the machine. These segment gears receive their oscillating motion from adjustable crankpins mounted on the drive gears, causing the bar to turn over to the desired angle and back, in one revolution of the main shaft. The angle of the fold is regulated by shifting the crank pins in the T-slots on the sides of the gear wheels, and by adjusting the length of the connection rod which actuates the segment gears.

All gears are guarded. The shipping weight is approximately 12,000 lb.; floor space, front to back, 92 in.; right to left, 152 in.

Iron and Steel Stocks in Japan

WASHINGTON, April 29.—Stocks of pig iron in warehouses in Japan declined to a value of 1,200,000 yen at the end of March as compared with 1,500,000 yen at the end of February, but stocks of steel increased to a value of 14,400,000 yen, as compared with 8,800,000 yen, according to a cable received by the Department of Commerce from Commercial Attaché Babbitt, Tokio. Stocks of machinery were valued at 11,200,000 at the end of March as against 10,900,000 at the end of February. The average value of the Japanese yen in March was 43.24c. compared with the par value of 49.85c.

MORE IDLE STACKS

Loss in Number of Active Pittsburgh District Blast Furnaces

April saw a substantial recession in the number of blast furnaces in production in the Pittsburgh and nearby districts. From a total of 114 in production at the end of March, there has been a drop up to and including April 29, of 19 stacks, with the downward tendency persisting and several other furnaces likely to be banked or blown out in the next few days. The decline in the Pittsburgh district proper has been nine furnaces as compared with a month ago; in the Mahoning and Shenango Valley district, six furnaces have stopped production, while there has been a loss of three stacks in western Pennsylvania and of one stack in the Wheeling district. The Struthers Furnace Co., Struthers, Ohio, will cease production May 1, and the furnace of the A. M. Byers Co., Girard, Ohio, will probably go out the same day. It is expected that either or both the Punxsutawney and Adrian furnace, located respectively at Punxsutawney and Dubois, Pa., will go out of production this week. The record of furnaces in and out of production as of April 29 compares with that of March 31, as follows:

Pittsburgh District

	Total	April 29, 1924 In	Out	March 31, 1924 In	Out
Steel Works Furnaces					
American Steel & Wire Co.					
Donora	2	2	0	2	0
Shoenberger	2	1	1	2	0
Carnegie Steel Co.					
Carrie	7	7	0	7	0
Clairton	3	2	1	3	0
Duquesne	6	4	2	5	1
Edgar Thomson	11	10	1	11	0
Edith	1	0	1	0	1
Isabella	3	2	1	3	0
Lucy	2	2	0	2	0
Neville	1	1	0	1	0
Jones & Laughlin Steel Corporation					
Aliquippa	5	4	1	4	1
Eliza	6	4	2	6	0
Soho	1	0	1	1	0
National Tube Co.	4	3	1	4	0
Pittsburgh Crucible Steel Co.	2	1	1	2	0
Pittsburgh Steel Co.	2	2	0	2	0
Merchant Furnaces					
Clinton Iron & Steel Co.	1	0	1	0	1
Total	59	45	14	55	4

Mahoning & Shenango Valley Districts

	Total	April 29, 1924 In	Out	March 31, 1924 In	Out
Steel Works Furnaces					
Carnegie Steel Co.					
Farrell	3	2	1	3	0
New Castle	4	4	0	4	0
Niles	1	0	1	0	1
Ohio	6	5	1	6	0
Sharon	1	0	1	0	1
Republic Iron & Steel Co.	7	3	4	5	2
Sharon Steel Hoop Co.	1	1	0	1	0
Trumbull Cliffs Furnace Co.	1	1	0	1	0
Youngstown Sheet & Tube Co.	9	6	3	9	0
Merchant Furnaces					
A. M. Byers Co.	1	1	0	1	0
Hanna Furnace Co.					
West Middlesex	1	0	1	0	1
Leetonia, Ohio	1	1	0	1	0
Dover, Ohio	1	1	0	1	0
Reliance Coke & Furnace Co.					
West Middlesex, Pa.	1	0	1	0	1
Sharpsville, Pa.	1	1	0	0	1
McKeefrey Iron Co.	1	0	1	0	1
Sharpsville Furnace Co.	1	0	1	0	1
Shenango Furnace Co.	2	2	0	2	0
Struthers Furnace Co.	1	1	0	1	0
Stewart Furnace Co.	1	1	0	1	0
Valley Mold & Iron Corporation	1	0	1	0	1
Total	46	30	16	36	10

Western Pennsylvania

	Total	April 29, 1924 In	Out	March 31, 1924 In	Out
Steel Works Furnaces					
Bethlehem Steel Co., Johnstown, Pa.	11	6	5	7	4
Merchant Furnaces					
Adrian Furnace Co.	1	1	0	1	0
American Manganese Mfg. Co.	2	0	2	0	2
Kittanning Iron & Steel Mfg. Co.	1	0	1	0	1
McKinney Steel Co.					
Scottdale, Pa.	1	1	0	1	0
Josephine, Pa.	2	0	2	2	0
Perry Furnace Co.	1	0	1	0	1
Punxsutawney Furnace Co.	1	1	0	1	0
Total	20	9	11	12	8

Wheeling District

	Total	April 29, 1924 In	Out	March 31, 1924 In	Out
Steel Works Furnaces					
Carnegie Steel Co.					
Bellaire Ohio	2	1	1	2	0
Mingo, Ohio	4	3	1	3	1
Steubenville, Ohio	1	0	1	0	1
National Tube Co.	2	2	0	2	0
Wheeling Steel Corporation	4	4	0	*4	1
Weirton Steel Co.	1	1	0	1	0
Total	14	11	3	12	3
Grand Total	139	95	44	114	26

*One furnace dismantled.

EXORBITANT DEMANDS

Many Advances in Wage Scales Proposed by the Amalgamated Association

What may be regarded as an effort to safeguard wages in the event of lower selling prices for bar iron, sheets and tin plate or the establishing of a minimum wage is contained in the wage scale adopted at the annual convention of the Amalgamated Association of Iron, Steel and Tin Workers of North America, which will be presented at the annual conference to be held starting about the middle of this month between representatives of that organization and the manufacturers operating mills under an agreement with the Amalgamated Association.

The proposed scale calls for a flat increase of $3 a ton in the boiling rate or the pay of the puddler, a 15 per cent boost in the rates for busheling on cinder bottoms, in the muck mill, the guide, 10-in., hoop and cotton tie mill scales and of 20 per cent in the knobbling scale. In the proposed sheet and jobbing mill and tin mill scales, there is a demand for a change in the preambles, whereby the crews would receive 2⅓ per cent of each 5c. per 100 lb. above $2.15, and 2⅓ per cent cut on each reduction of 5c. per 100 lb. down to $2.15. In the 1923-24 scale, the men received 1½ per cent of each 5c. increase above $2.15 in the average bimonthly settlement price, but took a like reduction on recessions down to as low as $1.80. The tin house scale as proposed would increase the crew pay from 1 to 1½ per cent of each 5c. increase in the average sales price and a like cut when prices went down 5c. per 100 lb. These constitute the important demands to be made upon manufacturers, but there are many others of a minor character which also are likely to be stoutly resisted at the Atlantic City conference.

As an example of what the new rate for boiling means, it might be pointed out that at 2.35c. per lb., the present Chicago price of bar iron, puddlers would be paid the same rate per ton they now receive on bar iron at 2.95c., or $16.13. The present scale calls for a boiling charge of $7 per gross ton on bar iron at 1c. per lb. and for each advance of 5c. per 100 lb. in the selling price to and including 1.25c., there is an advance of 10c. per ton in the boiling charge. On the next increase of 5c. to 1.30c. there is a rise of 83c. per ton in the boiling charge. Succeeding advances in selling prices of 5c. per 100 lb. to 1.75c. bring increases of 20c. per ton in the boiling rate, and then the ratio becomes 25c. per ton for each 5c. rise in selling prices. Starting with $7 per ton on an average sales price of 1c. per lb., the puddler receives $11.38 per ton when the bar iron price reaches 2c. per lb. The proposed charge of $10 a ton on 1c. bar iron would mean $14.38 at 2c. bar iron.

Among the minor demands is one that the company shall furnish the financial secretary a copy of the payroll, or its equivalent, of all men in all departments under the jurisdiction of the Amalgamated Association once each three months. Shearmen in the tin mills have discovered that their labor has increased between 25 and 35 per cent without pay increases and are asking a 50 per cent increase above the present base rate and that, as it is impossible to shear three turns in eight hours, the number of turns be reduced from three to two a day.

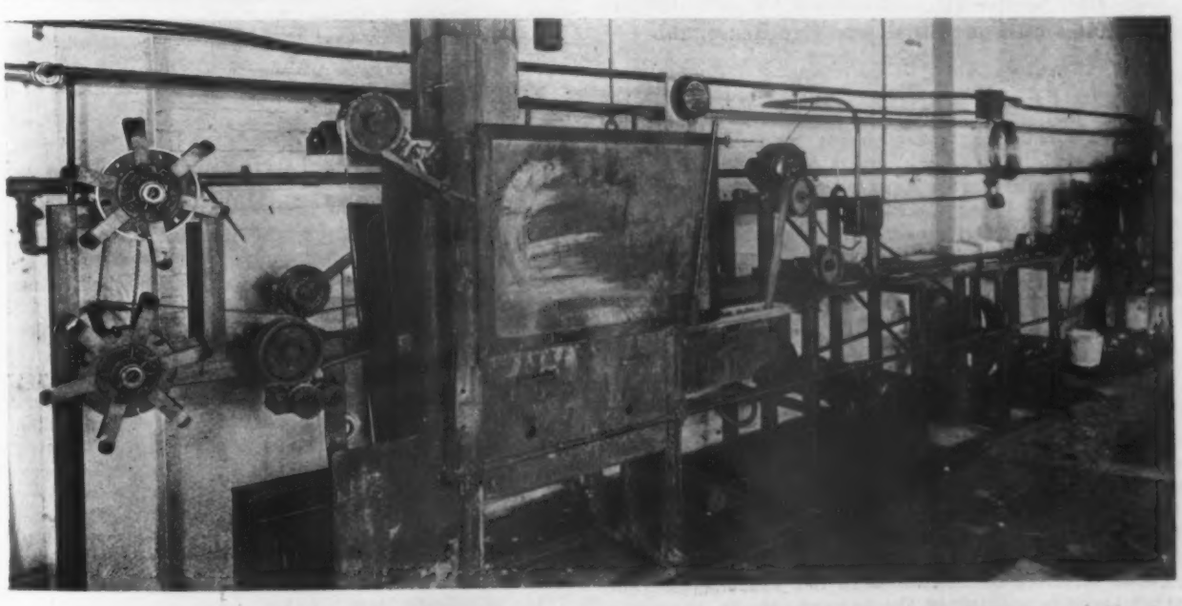
Making Solid Wall Tubes of Strip Steel

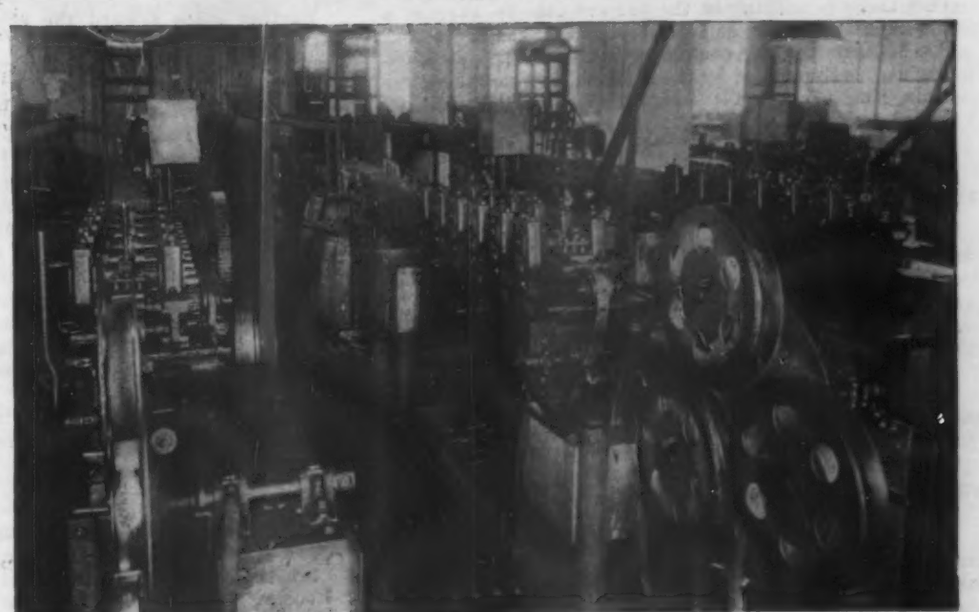
Material Wide Enough to Give Double Thickness of Wall —Tinned Before Rolling—Walls Soldered Together by Heat—Product Small in Diameter

A NEW method of manufacturing brass, copper and steel tubing by a continuous process has been developed by the Bundy Tubing Co., Detroit, Mich. Briefly the process consists of taking a strip of one half the thickness of the finished tube and twice as wide as would be required in forming a single circle of the required tube size, tinning the strip and then forming it on a specially designed tubing machine into a circle of double thickness walls and sweating the walls together. Thus is formed a solid tube, the wall of which is practically double except for the apparent seam running the length of the tube.

The tubing is made in sizes from ¼ to ½ in. outside diameter and from 20 to 30 gage strip material which is received in coils in 300 to 400 ft. lengths. The first operation is tinning which is done on a continuous automatic tinning machine. The stock on being drawn from the coil passes over pulleys and through an acid bath in which the grease is removed. Then it goes through a set of wipers which remove the surplus acid. From the wipers the strip passes through a tinning bath that is composed of 60 per cent tin and 40 per cent lead. Next the strip travels through sizing and driving roller pulleys, and through a heated scraping die which removes the surplus tin, and then to a hot water bath which tends to give the material a smooth surface. From this bath the material passes through rubber rollers that remove the surplus water and then on to recoiling reels.

The machine has a speed of 400 ft. per minute, but this is reduced to 20 ft. per minute when the end of one coil of strip is being fastened to the succeeding





Strip Steel (Above) Starting from the Coils at the Extreme Right Pass through an Acid and then a Tinning Bath. The tin later acts as a solder to fasten together the two thicknesses into a solid tube. The strip is recoiled on the reels at the left and goes to the tubing machine

In the Continuous Tubing Machines, (at Right) the Tinned Strip in Coils Passes from the Reels at the Right Through an Acid Bath and Then Through a Series of Rolls Which Form the Material Around the Arbor into a Tube of Double Thickness. The tube is then heated and the two tinned walls are sweated together, making a solid tube

coil. It is driven by a 1-hp. motor. The temperature of the tin bath is checked by a thermometer to avoid the danger of overheating and a check of the contents is made several times a day. The entire bath is removed and the pot cleaned every three or four days to eliminate any possible accumulation of foreign matter that might result in unsatisfactory tinning.

The tinned coils go from tinning machine to the automatic tubing machine. Three coils are placed on racks in the front of the machine, two being ready for use while the material is being fed from the third coil. From the rack the tinned strip passes under a pulley, through an acid bath and between rubber pulleys that remove the surplus acid. It is then automatically fed through a series of six 3-in. rollers placed on 9-in. centers, which roll the strip around a stationary arbor into a tube with a double wall with the seam always on top and in a straight line.

From the rolls the tubing goes into a gas heated preheater and on through a sweating die where surplus soldering is put on and in which the two tinned walls are sweated together into one solid wall. The tube then passes through five sizing and scraping dies which bring it to exact size. Then it goes through a water cooler and on to a receiving table where as finished tubing, tinned inside and out, it is cut in lengths of about 35 ft. Later it is sawed into smaller lengths as required and tested under 15 lb. per sq. in. water pressure. Much of the material is bent on bending fixtures to meet customers' specifications and if desired, complete fittings are put on.

The speed of the tubing machine ranges from 65 to 175 ft. per minute, the larger tube and heavier gages requiring slower speed. It is stated that the tubing is held within 0.004 in. limits in outside diameter. In making the tubing an allowance of 0.0009 to 0.0029 in. is made for tinning and sweating.

The tubing is being used on automobiles for gas and oil lines and to some extent in place of solid rods for operating engine valves. It is stated that tests have shown that it is equal in strength to seamless steel tubing. It is so flexible that it can be easily bent by hand, has a smooth surface and possesses uniformity. Soft open hearth cold rolled strip steel is used in two gages lighter than brass for the same size of tube. It is pointed out that the coating of the tin on steel tubing made by this process makes it impervious to rust and certain acids.

BUFFALO COMPLAINT DENIED

Interstate Commerce Commission Declares Buffalo Rates on Coke, Coal, and Ore Reasonable

WASHINGTON, April 29.—Dismissing a complaint of the Lackawanna Steel Co. and other producers in the Buffalo district, the Interstate Commerce Commission last week held that rates on coal and coke from the Reynoldsville, Pittsburgh and Connellsville, Pa., districts to Buffalo are not unreasonable; that rates on iron ore from lower Lake Erie ports to competing interior iron and steel makers are not unreasonably low or unremunerative, and that the relationship between the ore and coal rates is not unduly preferential.

The Buffalo producers had alleged that rates charged on coal and coke from the three districts and related districts to Buffalo are unjust and unduly prejudicial in comparison with rates charged competitors on iron ore from Lake Erie ports to interior iron and steel producing points. The commission was asked to prescribe just rates, including minimum rates on iron ore. Practically all other iron and steel companies having plants in the territory involved, including those on the lake front, intervened on behalf of the railroads.

The Commission pointed out that it had previously found that the coal rates from Pittsburgh and contiguous districts to Buffalo were not unreasonable and that there is nothing in the present case to warrant a different conclusion as to either coal or coke.

The basis for the complaint just dismissed, it is explained, is illustrated by the rates on ore from the lower Lake Erie ports to Pittsburgh and on coal from Pittsburgh to Buffalo. At present the rate on ore from lower Lake Erie ports, including the dock handling charge, is $1.214 per gross ton, while the coal rate from Pittsburgh to Buffalo is $2.51 per gross ton. It was the increase in spread since the advance rates of June 25, 1918, and especially in the application of the increases in the ore rates exclusively to those from the mines to the upper lake ports, with no change in the ex-lake ore rates, which was the principal ground for the present complaint. It was charged by the Buffalo producers that there has resulted such change of transportation costs that they are deprived of the benefit of their favorable geographical location with respect to ore which they obtain without rail transportation beyond the lake, while the relatively unfavorable features of this location with respect to their coal supply have been increased. In the complaint they suggested a 13c. reduction in the coal rates and an increase of 30.8c. per gross ton in the ore rates. In the argument, the opinion states, they said that it would be satisfactory if the relationship which they think is proper should be brought about by reduction of the coal rates, without changing the ore rates. The opinion deals with costs of transportation and revenue obtained by the carriers which were involved in the proceeding, and then adds:

"The record contains no suggestion that the Buffalo furnaces cannot produce * * * as cheaply as the interior furnaces or that they cannot successfully compete with the interior furnaces; in fact, the contrary appears to be the case."

New Records Made by Indiana Steel Co. at Gary in March

In the month of March, the Indiana Steel Co., Gary, Ind., produced the largest tonnage in its history. The output of 325,000 tons of ingots was 48,000 better than the best previous monthly production, which was made in October, 1923. Record tonnages were also produced in the open-hearth furnaces, the billet mill and the merchant mill. The billet mill started the new year with a record of better than 98,000 tons for January. In March it produced over 120,000 tons. The merchant mill department rolled 102,000 tons in March, bettering the previous record of May, 1923, by nearly 8500 tons.

To Consider Standard Specifications for Condenser Tubes and Ferrule Stock

Further steps toward the efficient development of marine engineering practice will be taken on May 5, when a meeting will be held in the Division of Simplified Practice, Department of Commerce, Washington, to consider standard specifications for condenser tubes and ferrule stock. The American Marine Standards Committee, in cooperation with the Federal Specifications Board and the American Society for Testing Materials, will cooperate with the Department of Commerce in the program. The conferees will seek to reconcile differences in present and proposed specifications and to develop an acceptable common standard in the interests of simplification. When the Marine Standards Committee recently began study of specifications for condenser tubes, it found that other groups were working on similar lines. Realizing that there was a necessity of clearing away existing confusion as to what constitutes proper tubes, it determined to bring the various interests together, and found a ready response to its suggestion for a conference.

Bagley & Sewall Co., Watertown, N. Y., has just shipped a 142-inch Fourdrinier paper-making machine, the second largest ever to be sent to Japan, to a firm in Keushu. It weighs 850 tons and 35 freight cars were used to ship it. Sixty thousand feet of lumber were used in the packing.

BETHLEHEM'S GOOD SHOWING

President Grace Attributes Recent Decrease in Orders to Attitude of Congress

Earnings of the Bethlehem Steel Corporation in the first quarter were the best since the second quarter of 1923, when demand called for capacity operations and before the change to the shorter work-day had taken a hand in raising the cost of production. Total income reached $10,549,149, against $9,935,147 in the last quarter of 1923. The report showed net income of $4,519,875 available for dividends, against $3,818,442 in the last quarter of 1923. After allowing for dividends on the preferred stock, there remained an amount equivalent to $1.91 a share earned on the outstanding common stock.

Its steel plants during the period operated at nearly 80 per cent of capacity, although the recent lessening of demand has brought present operations down to 66 per cent. President Eugene G. Grace attributed the hesitation in business to the neglect of Congress to heed the wishes of the President and the people for legislation such as will bring a "proper downward revision of the wartime tax burden."

A statement of earnings for the last two quarters reported appears below.

	First Quarter, 1924	Last Quarter, 1923
Total income	$10,549,149	$9,935,147
Less interest charges, etc.	3,079,598	3,270,244
Balance	$7,469,550	$6,664,902
Less provision for depreciation and depletion	2,949,675	2,846,460
Net income	$4,519,875	$3,818,442
Less dividends		
Preferred	$1,074,603	$1,080,274
Common, 1¼ per cent.	2,247,213	2,246,315
Total	$3,321,817	$3,326,589
Surplus for quarter	$1,198,057	$491,852

In response to questions the president said that unfilled orders carried on the books are well distributed and represent a demand from all lines of consumers, and that there is good demand for railroad steel, but the roads are not expected to buy as many cars as in 1923; that on the other hand, demand for maintenance steel is larger than it has been for several years, structural steel demand is exceptionally good, and that while buying of structural steel up to a short time ago was confined to this district, inquiries of late have come from all parts of the country.

Regarding foreign business, he expects good demands from Japan, but pointed out that reconstruction work can not be done overnight and therefore orders will be distributed over a long period.

Mr. Grace expressed the opinion that in general no great concession from current price levels can be expected as costs would make it unprofitable to carry on business. He expects no serious demands for increased wages. The average hourly wage of the company for the first quarter of 1924 was 63.7c. per hour, against an average of 59.8c. for 1923. The increase was due chiefly to the shorter working day.

The company spent $5,000,000 for improvements in the quarter reported on the plants of the Lackawanna Steel Co. and the Midvale Steel & Ordnance Co.

Harold Stanley, who resigned from the board of directors last year, was reelected. Regular dividends on preferred and common stock were declared. Both are payable July 1 to stockholders of record June 2.

Westinghouse California Plant

The Westinghouse Electric & Mfg. Co. has awarded a contract for the construction of a second large building unit on its 12-acre plot in Emeryville, Cal. This new plant when completed will provide accommodations for a large assembling shop, extensive service and repair shops, a zone warehouse and various other facilities for serving the Pacific Coast trade.

The structure will consist of three-story sections, each about 66 ft. wide, with a large central high covered aisle down the center of the property between the east and west wings. The ground space covered by this unit will be approximately 200 x 245 ft. Spur tracks will be run into the central aisle to provide facilities for loading and unloading carload shipments under cover. It is the plan at the present time to equip the structure with nine electrically operated cranes, and four electric elevators of large capacity will be installed.

The front or extreme southerly section of the building will contain the service and repair shops. In this department all kinds of electrical machinery will be repaired, and switchboards and switch panels of all types will also be manufactured. The east wing of the building will be devoted to assembling, and the west wing will provide necessary space for a zone warehouse.

Pacific Sheet Steel Corporation Starts Operations at New Plant

The Pacific Sheet Steel Corporation, subsidiary of the Metal & Thermit Corporation, started operation at its new sheet mill in South San Francisco, Cal., on April 14. This plant is equipped with six mills and will produce black, galvanized and blue annealed sheets.

The officers of the new corporation are: F. H. Hirschland, president; H. E. Rogers, vice-president and secretary; E. Becher, treasurer, and Benjamin Anderson, assistant treasurer.

Among the directors are: W. T. Graham, chairman; John A. Topping, F. S. Wheeler, Edgar L. Marston, F. H. Hirschland, H. E. Rogers, E. Becher, and D. E. McLaughlin, vice-president Pacific Coast Steel Co.; M. J. Sullivan, vice-president American Can Co.; Charles R. Hughes, manager Pacific Sheet Steel Corporation; Em. Kardos, manager Metal & Thermit Corporation.

The new rolling mill represents an investment of $1,500,000 and employs 200 men, most of whom have been brought from the East.

The Pacific Sheet Steel Corporation owns about 40 acres of land, and its mill is next to that of the Pacific Coast Steel Co., which produces the sheet bars for the new enterprise. Charles R. Hughes, under whose direction the plant was built, was for many years connected with the American Rolling Mill Co., Middletown, Ohio. George S. Squier, who is well known on the Coast through his long experience in selling Eastern sheets, has charge of the sales of the new corporation.

Record Breaking at Lackawanna Plant

BUFFALO, April 28.—Sixty employees of the Lackawanna plant of the Bethlehem Steel Co., who had been instrumental in setting up new monthly production records in three departments of the plant, last week celebrated their achievements by a dinner in the Hotel Buffalo. Local production records were broken in the spike, bolt and nut department, the blast furnace and open-hearth departments. Timothy Burns, general manager, was the principal speaker. He complimented the men on their achievement and discussed the commendable spirit which existed between workmen and officials of the plant. R. G. Cartus, superintendent of the spike, bolt and nut department, was toastmaster.

Eastern Machinery & Equipment Co. Buys Ace Motor Co.

The Eastern Machinery & Equipment Co., Philadelphia, purchased at the sale of the Ace Motor Co., April 22, the complete good will, drawings, patterns, jigs, dies, tool equipment, the use of the name of the Ace Motor Co., including a large number of catalogs, the right to bill and sell, as well as a large quantity of finished parts in stock.

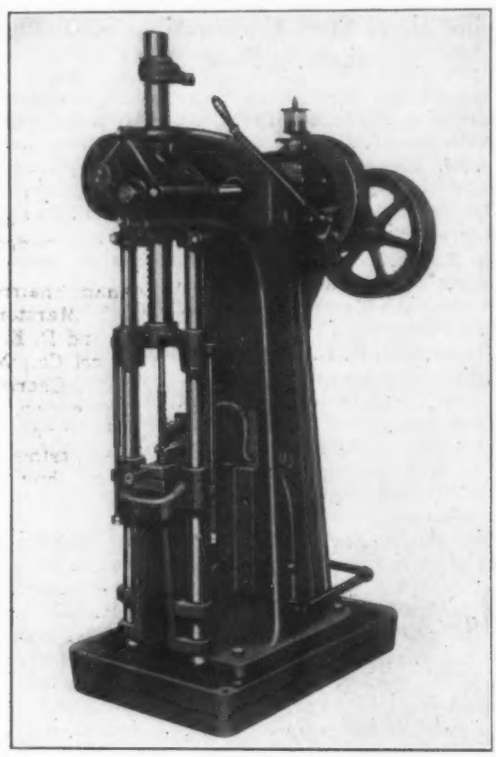
The Eastern Machinery & Equipment Co. is not in position to state whether or not it will equip a plant, which this company now owns, located in Camden, to manufacture the above, or offer for sale this entire purchase.

The Jones & Laughlin Steel Corporation, Pittsburgh, according to reports current in Chicago, is drilling for foundations at the site of its proposed plant at Hammond, Ind.

New Development in Broaching Equipment

What is considered a new item in the broaching field is the sub-press broaching fixture shown in the accompanying illustration, which has been brought out by the Hercules Mfg. Co., 446 East Woodbridge Street, Detroit, for use in conjunction with its 15-ton broaching press.

It is claimed that before the advent of the sub-press method of broaching, it has been impossible to correct inaccuracies in holes by a broaching operation, because the broaches would follow the line on which



Sub-press Used in Connection with a Broaching Machine to Correct a Rough Drilled Hole and Thus Permit Broaching in Place of Boring or Grinding

the rough hole was drilled or reamed. By use of the sub-press it is proved possible to correct a rough drilled hole to a smooth, straight, perfectly round hole which will be at right angles with the faces and concentric with the diameter. This, it is believed, will allow many manufacturing operations which it is now necessary to bore or grind to be finished by the much more rapid and accurate method of broaching.

The cut shows the sub-press set to correct a rough-drilled hole in the steel on the small end of a connecting rod for one of Detroit's large automobile plants. After broaching, the small hole is plugged on the fixture and the large end of the rod is likewise finished. The increase in production was found to be 20 to 1 over the grinding operation and the work showed uniform accuracy.

The work is held in a correct position by a suitable fixture through which the pilot end of the broach is passed into the guide bushing in the lower guide. Power is then applied and the upper guide, which carries the bushing to fit the shank of the broach, moves downward, carrying the broach (which is now guided at both ends) through the work, correcting the hole in the work.

After the broach has passed through the part, the power feed is automatically thrown out. On the return of the ram, the lower guide is lifted back to the loading position by means of check nuts on the feed rods.

This sub-press will be a standard product to be used with the Hercules broaching press, but may be obtained on special order.

May Meeting of American Iron and Steel Institute

The twenty-fifth general meeting of the American Iron and Steel Institute will be held at the Hotel Commodore, New York, on Friday, May 23. The papers to be read at the morning and afternoon sessions are as follows:

The Manufacture of Steel for Ordnance Purposes, Commander J. B. Rhodes, United States Navy Yard, Washington.

The Influence of the Composition of Iron Ores on the Cost of Manufacture of Pig Iron, H. Foster Bain, director United States Bureau of Mines, Washington.

Selling Practices in the Steel Industry, Ernest T. Weir, Weirton Steel Co., Weirton, W. Va.

Uniform Coking Coal as a Factor in Blast Furnace Economy, Walter Mathesius, Illinois Steel Co., Chicago.

Hardened and Ground Rolls, J. R. Adams, superintendent of Research, the Midvale Co., Nicetown, Philadelphia.

Power Requirements for Rolling Steel, Gordon Fox, electrical engineer, Freyn, Brassert & Co., Chicago.

Gas Cleaning, Wet and Dry Methods, G. M. Hohl, Bethlehem Steel Co., Bethlehem, Pa.

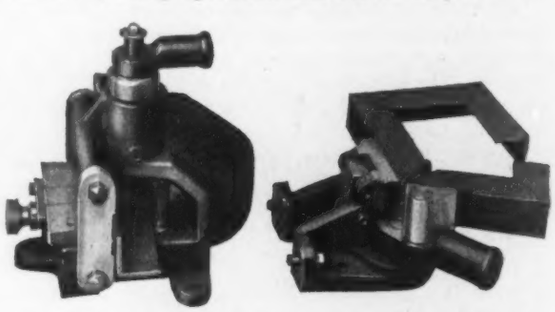
Proposed Tariff Schedules Suspended

WASHINGTON, April 29.—The Interstate Commerce Commission today announced the suspension from May 1 to Aug. 29 of tariff schedules proposing to establish a scale of class rates applicable on iron and steel products from Buffalo-Pittsburgh group points to Carolina territory higher than the present scale of class rates to be applied alternately against existing commodity rates on iron and steel products. Indicative of the proposed increases, the suspended tariff schedules would increase the first class rate from Youngstown, Ohio, to Danville, Va., from $1.26 to $1.595 per 100 lb.; the second class rate, from $1.04 to $1.385; third class rate, from 86c. to $1.065; fourth class rate, from 63c. to 81c.; fifth class rate, from 54c. to 65c., and sixth class rate, from 41c. to 54c.

For Notching and Bending Angles

A new angle iron notcher and bender will be ready for the market in the second week of May. It is made by the Whitney Metal Tool Co., maker of ball bearing punches, Rockford, Ill. At the left is shown the notcher and at the right is the bender. The latter may be attached to the notcher but may be used with or without it.

The anvil on the bending arm rotates in conjunction with the bending operation and serves to prevent dis-



The Angle Bar Is Notched in the Device at the Left and Bent as Desired in the Device at the Right

tortion, making a neat job. The bender is adapted for bending 2 x 2 x ¼-in. angles or smaller. Unlike the old bench vise, it is made especially for use on angles. In all angle iron there is a fillet in the corner. In order to make a good miter, it is necessary that a notcher be so arranged as to shear out this fillet. The angle is held firmly up to the shearing blade by means of a clamp screw. The punch, or shearing blade, enters the die by means of a pilot. The upper shear blade is made of a high grade tool steel and inserted so that it is inexpensive to replace in case of wear. The notcher is also supplied with a patented ball-bearing spindle.

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ESTABLISHED 1855

THE IRON AGE

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Steel Earnings and Wages

THE great change that has come in the relationship between wages and earnings in the steel industry is shown in concrete form by comparisons made of the United States Steel Corporation's statistics. Each of the 22 annual reports of the corporation has given a statement of the total wages and salaries paid. As there are fluctuations from year to year the better comparison is made by taking, say, the first five and the last five years in Steel Corporation history. In the table below the first column gives the total payment of wages and salaries. It might be more interesting to have a statement excluding salaries to executives and managers, but this is not available. The second gives the total earnings, before interest payments by subsidiary companies. The third and fourth columns give the respective percentages which the figures in columns one and two bear to their total:

Steel Corporation Wages and Salary Payments and Total Earnings

	Wages and Salaries	Total Earnings	Proportion—Wages	Proportion—Earnings
1902....	$120,528,343	$140,155,191	46.1%	53.9%
1903....	120,763,896	115,725,013	51.1	48.9
1904....	99,778,276	79,749,668	55.6	44.4
1905....	128,052,955	132,805,063	49.1	50.9
1906....	147,765,540	165,925,156	47.1	52.9
Total...	$616,889,010	$634,360,091	49.3	50.7
1919....	$479,548,040	$152,290,634	75.9%	24.1%
1920....	581,556,925	185,095,359	75.9	24.1
1921....	332,887,505	100,791,280	76.8	23.2
1922....	322,678,130	109,788,916	74.6	25.4
1923....	469,502,634	187,953,668	71.4	28.6
Total...	$2,186,173,234	$735,919,857	74.9	25.1

In both these five-year periods there were good years and bad years, and as is common in all lines of industry in the bad years the proportion of wages to earnings was above the average. Within neither of the periods was there any definite trend for the proportions to change. The great change occurred between the periods covered by the table, i. e., in the years 1907 to 1918 inclusive, and particularly in the war period, though not entirely in the war period.

In the first five years there was approximately $1 for wages and salaries to $1 of earnings. In the last five years there was approximately $3 of wages and salaries to $1 of earnings. Precisely, there was in the first period 97 cents of salaries and wages to $1 of earnings and in the second period of $2.97, or more than three times as much.

The proportions here shown are not cognate with the division of income between capital and management on the one hand and wages and salaries on the other hand which the economists have been computing of late. A portion of the Steel Corporation's earnings given in the above presentation was spent in improvements and replenishments in which wage and salary payments were involved. The comparison made in the case of the Steel Corporation, however, shows the same trend that has been seen in the division of the total income of the country—that a larger proportion goes for wages and a smaller proportion for rent and profit of capital than was the case before the war.

The Metal Trades Anniversary

THE convention of the National Metal Trades Association held in New York last week was of unusual interest because it marked the rounding out of 25 years of eventful history. A quarter of a century ago conditions in the labor world were far different from those of today. Then the unions largely dominated the situation. For a time the new association tried to work with the unions, but the latter insisted on impossible restrictions and it was decided to put the plants of the members on an open-shop basis. Naturally the unions challenged the new policy and many strikes followed, continuing through a number of years; in fact, only in the past two or three years have the members been free from serious troubles in some parts of the country. The past year has been marked by almost entire freedom from disturbance and the association has been able to carry on its constructive work in a large way.

The reviews of the history of the association by Past Presidents Covell, Copeland, Sharpe and Rice, as well as by President Coleman, were of ex-

ceeding interest. It was well said that while it was profitable to review the past, it was even more important to keep an eye on the future. Mr. Copeland brought out aptly the danger of the association's having a smug feeling and not keeping up with progressive measures. The program indicated, however, that the members are alert in such things as medical service for industry, industrial education and prevention of industrial accidents. A gratifying statement was that young men were taking more kindly to industrial training than they did a few years ago, and the need of training a larger number of apprentices was clearly shown. Indeed, if prosperous conditions prevail, labor of all kinds will be needed to a greater extent than it promises to be available under the new immigration law.

The association starts the second quarter century with able officers and with promise of even greater usefulness.

Forward Steps in Electrolytic Refining

THE great extent of the industries devoted to the electrolytic production of metals was impressively emphasized at the meeting of electrochemists in Philadelphia last week. In the United States, as well as in other countries, the advance made in recent years is remarkable.

In copper, since pre-war operations, the capacity for electrolytic production has increased about 57 per cent. The recovery of copper from copper-zinc solutions has been an outstanding achievement. Two valuable papers contributed at Philadelphia revealed not only the simplicity of the operations in South America and South Africa, but pointed also to further possibilities and their effect on the American industry.

In tin, great progress has been made, and a product of high purity is now possible, due to researches of American electrochemists. It cannot, however, compete with Straits tin and today no tin is being refined in the United States.

In nickel, the Hybenite process is pointed to as of chief significance, a feature being the recovery of precious metals. The principle of flotation, combined with electrolysis, has solved the zinc-lead-silver ore problem and made possible the production of pure zinc as well as lead.

In iron, an American electric company is now making electrolytically 25,000 lb. each week, and in France boiler tubes are being deposited on a revolving mandrel. An American plant is in commercial operation making pure iron. Further developments are on the horizon.

Cheaper hydroelectric power will mean much, not only in the development of present fields, but in the expansion of the industry which has to do with fused electrolytes and the winning of magnesium, calcium, sodium, and other metals apart from aluminum. Refining by electricity is plainly destined to make still greater progress in competition with refining by fire.

THE day-to-day character of some of the current buying of finished steel is illustrated by an incident in the experience of a wire company. A request came up to the head of the sales department for additional clerical help in the handling of orders in an important office. Naturally the comment was passed that at a time like the present, with the contraction in business that has been seen since February, the tendency would ordinarily be to reduce rather than increase the force. The reply was that the 174 orders received by the office in question on the preceding day amounted to the imposing total of 125 tons!

The Rest Period in Industry

THE practice of breaking the half-day in manufacturing plants with rest periods has been tried out by various companies, especially where women are a majority of the workers, and in some cases such periods have been established as part of the every-day routine. It has been found that a greater production is secured if employees are compelled to stop for a few minutes and relax mind and muscles, the results being more marked where the work demands a sitting posture and where there is a frequent repetition of physical and mental operations. In some plants a simple nourishment is furnished, such as a cup of hot broth or chocolate, and in the cold months windows are thrown open to admit fresh air. Individual experiments have met with greater or less success.

The British Industrial Fatigue Research Board, which has been making a long series of scientific tests, in the laboratory as well as in factories, has reached the conclusion that in spite of shortened labor periods of workers and machinery output is increased by rest pauses. The report of the board deals specifically with the effects observed in light repetition work. To quote *Engineering*, London:

> The results varied with individuals and with different operations; but in round numbers they showed that with the intercalation of a 10 or 15 minutes interval into a 4 or 4½-hour spell of work an increase in daily output of the order of 5 to 10 per cent might be obtained. In one instance a still more ample system of rest pauses was adopted, girls assembling bicycle-chain constituents on pendulum presses being given rests of 5 minutes four times during the morning and three times during the afternoon. Their work was observed for some 14 months, during the first six weeks of which the rest pauses were not introduced. Assuming that their output during these six weeks represented fairly their normal output on continuous work, the result of the introduction of the rest pauses was that the daily output increased immediately and steadily, reaching in 24 weeks a fairly uniform level some 13 per cent higher than in the pre-pause six weeks, which it maintained throughout the remaining 32 weeks, in spite of the sacrifice in rests of 7 per cent of the working time. The example is striking, because each operation took only about nine seconds, and, as it required close attention, must have involved a considerable amount of concentrated work and rapid repetition.
>
> A notable circumstance was that the slowest workers derived considerably more advantage from the rest pauses than the quicker. Thus in each of two different operations, the hourly improvement of the output of the slowest group of workers, when the whole of the workers had been divided into three groups according to their speed of working, showed more than double the improvement from the rest pause than was shown by the fastest, and the intermediate girls showed an intermediate extent of improvement.

It has been pointed out in connection with the rest plan that the sum total of idle hours involved may be no greater than that which accrues in the

ordinary course of events, as each worker lets up for a few minutes now and again. The British report mentions this aspect as a factor of importance. Advocates of the plan have always held that brain and body go to work with new vim after brief rest and relaxation, just as children are freshened by their school recess. This latest investigation seems to bear out this view, in respect to light repetition work.

Scrap as a Barometer

ATTENTION should be directed to the importance of the iron and steel scrap market as a barometer to general conditions in the steel trade. The continually increasing part that scrap plays in the industry is more or less generally recognized. As our store of iron and steel in service has increased, the tonnage that annually becomes useless for its original service necessarily increases.

In connection with the increasing outcome of scrap two points may be mentioned. Twenty years ago, or up to Jan. 1, 1904, about 260,000,000 tons of pig iron had been made in the United States. Up to the beginning of this year about 825,000,000 tons had been made, or 3.2 times as much. Using the familiar conception of iron and steel having an average life of service, if this average did not vary then the outcome of scrap in any year would be in relation to the production a given number of years earlier. As production was increasing more rapidly in the past than it is now, the proportion of outcoming scrap to fresh material being produced would necessarily be increasing.

In the very nature of things scrap prices have a tendency to anticipate what is to occur in steel mill operations. A steel mill produces a great deal of scrap itself. Over a period of years the statistics show approximately 75 per cent as much rolled steel produced as steel ingots. The mill must make steel before it makes its scrap, and to make the steel it must have scrap. Hence when mills are increasing their operating rates they need more scrap from the outside. When they are decreasing operations they have scrap from ingots previously made, while they need scrap only for the smaller quantity of ingots they are about to make. There are also some variations in their demand for outside scrap according to variations in tonnage of ingots and semi-finished steel they carry.

Market prices of scrap are more sensitive to changes in the relation between supply and demand than are pig iron prices, and much more than finished steel prices. It has long been observed that when steel trade conditions are improving scrap prices are prominent in advancing.

As a practical test of what scrap might do as a barometer a comparison in recent history may be made. The average price of heavy melting steel scrap at Philadelphia, Pittsburgh and Chicago was at a low point at the end of last October. Our quotations for the date of Oct. 30 averaged $14.50. Then advances began, and a high point was shown for Jan. 29, $19.83. Declines at once set in, and for April 22 the average was back to the former low point, $14.50.

The showing is too good to be entirely true or trustworthy. One cannot always expect the scrap market to speak so loudly so far ahead, for the record is that scrap began to advance two months before steel mill operations reached their low point. The principle, however, undoubtedly exists. As to warning that steel was to become less active, it was in the early part of March that the highest rate of ingot production obtained. While the high point in scrap was Jan. 29, with an average in the three markets of $19.83, on March 4 the average was down to $18.17. The scrap market already had lost nearly one-third of its advance.

The Iron Age and Its Readers

LAST week we mentioned the "reading slips," so-called, which our Reader Service Department supplies to readers as a means of enhancing the value of THE IRON AGE as a working business tool. Today we refer to a service established some three years ago by our Advertising Department to the same end.

We mean the numbering of the advertising sections. This innovation has been well thought of, judging from the complimentary letters that have come without any solicitation. Its service feature will be understood when it is stated that the advertising of any product may be found in ten seconds.

The advertising had long been grouped for reader convenience, but it remained to take the forward step of numbering the index of the classifications (on page 5 of the advertising section of every issue) and carrying the corresponding numbers at the top of the pages of each group or section. On finding the section number on the index page, the reader is quickly guided by the section numbers shown in parentheses on the top of each page. Incidentally the sum total of all the sections shows the magic number 57.

Similarly we are trying to make it easy for the reader to locate subjects of special interest in the reading pages. The table of "Contents" (located by page number on the front cover page) has been given a whole page for nearly four years, but recent changes have made it more effective. The reader who knows where to turn without an index to the parts of particular interest to him has a right to expect good help in keeping informed on related subjects. The "Contents" page is intended also to aid in locating an article weeks after the date of issue. Suggestions on ways of making it more useful will be welcome.

Pittsburgh Basing Custom Is Disapproved

Extracts from Examiner Bennett's Report Assert Tendency Is to Enable Respondent Companies to Dominate the Steel Market—No Precedent in Other Industries

WASHINGTON, April 29.—The statement made in THE IRON AGE, April 10, page 1100, that the report of Examiner J. W. Bennett of the Federal Trade Commission in the Pittsburgh plus case is unfavorable to the United States Steel Corporation is substantiated by extracts from the report which have been published in the Chicago *Tribune*, April 26, under a Duluth date line. Despite this publication, the Federal Trade Commission declines to make public the report but there is no doubt about the authenticity of the extracts which have been published.

In the complaint issued by the Federal Trade Commission, the United States Steel Corporation and various subsidiaries are charged with unfair methods of competition and a violation of Section 2 of the Clayton act. On this point, Mr. Bennett is quoted as follows:

"The Pittsburgh plus practice had a capacity and a tendency to aid the respondent corporations to dominate the steel industry from a merchandising standpoint and to extend the sales policy of the respondent corporations to the rolled steel industry in the entire country.

"It was to the business advantage of Pittsburgh producers to follow the prices of the respondent corporations and not to interfere with the Pittsburgh plus practice."

The report, according to the *Tribune*, states that while other industries quoted basic prices, there is no precedent found for Pittsburgh plus in any other industry, because of the different circumstances surrounding such markets.

Position of Steel Corporation

Denial is also made of the argument of the Steel Corporation attorneys that Chicago is a district of underproduction as contrasted with Pittsburgh, a center of surplus output. Testimony of leading economists, dealing with the question of supply and demand, and testimony of other witnesses which showed that Chicago and Western mills had shipped into Eastern territory 583,604 tons of rolled steel in the high demand year of 1920, were referred to by Mr. Bennett. He is quoted as follows:

"According to uncontradicted testimony of economists, that indicated a surplus in the Chicago district at the prices then prevailing as far as steel was sold in accordance with the Pittsburgh plus practice, and so indicated a lack of free competition in the steel industry."

The examiner is also credited with the statement that Western producers have been kept out of the best sales territory, for the largest demand for primary rolled products still is in the East. On the subject of competition, he is quoted as follows:

"Free competition was not only not shown by other evidence in this proceeding, but other evidence showed conclusively that to the extent to which the Pittsburgh plus practice was followed there was no price competition whatever."

No Free Competition

Other statements, summarizing the findings are as follows:

"There could be no free competition in prices and adherence to Pittsburgh plus at the same time."

"Producers were not on the same competitive basis. Pittsburgh producers had a country-wide sales territory, while producers outside Pittsburgh had restricted territory."

"Purchasers were not treated alike."

"Purchasers from Pittsburgh systematically were given lower prices than purchasers elsewhere, no matter what point furnished the product."

"Prices at Chicago were not reduced toward the cost level."

"Purchasers served by the lowest cost plants paid the highest prices for the goods bought."

Public Interest Ignored

"Purchasers were not given the benefit of low production costs, which, from the standpoint of public interest, is the chief function of price competition."

"Pittsburgh plus represented a discrimination which interfered with, if it did not actually prevent, competition in the manufacturing and distribution of bars, plates, shapes, and other products."

"Proximity to Pittsburgh, and not the producing mills, under the Pittsburgh plus practice, determined the advantage or handicap of the purchaser."

"As the result of the discrimination in price between purchasers from the United States Steel Corporation through its subsidiaries, the Carnegie Steel Co., the Illinois Steel Co. and the Minnesota Steel Co., customers of the Illinois Steel Co. and Minnesota Steel Co., located in territory in and about Chicago or in territory to the west thereof, who use steel bars in the manufacture or fabrication of other products sold in interstate commerce, were prevented from competing at all with purchasers of steel bars from Pittsburgh, from respondent Carnegie Steel Co., who use such steel bars in the manufacture or fabrication of products sold in interstate commerce."

The amount of discrimination was sufficient, according to the examiner, "to prevent the fabricators purchasing from Western plants from competing with Eastern fabricators purchasing from Pittsburgh."

Urge Publication of Examiner's Report

The Federal Trade Commission is urged to release for publication the report of Examiner J. W. Bennett in the "Pittsburgh Plus" case, in a resolution unanimously adopted by the Chicago City Council, April 25. It is averred that the findings of the examiner which were formulated on the basis of the testimony in the case which consists of 50,000 pages of typewritten matter and exhibits covering hearings over a period of over two years, are of "great and acute interest" and that the public is entitled to their publication.

Editorial opinion among leading daily newspapers in the West also indicates an increasing demand for an announcement of the conclusions reached by the examiner.

The Chicago *Tribune* says: "In justice to the tremendous public interest involved that report ought to be made public. The public has a right to know the facts in this vital question. There is no reason why this report made by a public employee for a Government commission should be kept secret. All the hearings have been public. All the many and various steps leading up to the report have been made public. The conclusion ought to have the same publicity."

The Duluth *Herald* says: "If this proceeding had been before the Interstate Commerce Commission, which surely is not a less important body than the Federal Trade Commission, and which surely does not deal in issues less vital, the examiner's report would be public as a matter of right and in the public interest. Why should it be different with the trade commission?"

European Markets Generally Are Stagnant

Orders for British Cruisers and for German Locomotive Work the Only Active Elements—Recovery of the Franc Not Yet Fully Absorbed

(*By Cable*)

LONDON, ENGLAND, April 29.

BUSINESS generally is quiet after the holiday intervention, but the tone of pig iron is steady. There is a noticeable improvement in the export demand for all grades.

Hematite is steady, some makers having disposed of their entire stocks. There are good Continental inquiries. Foreign ore is stagnant, Bilbao-Rubio being held nominally at 23s. 6d. ($5.16), c.i.f. Tees.

Finished iron and steel are dull, but the makers are disinclined to grant concessions owing to the present unremunerative prices, and it is anticipated that any substantial demand would raise the prices promptly. Meanwhile, the works are moderately busy on current contracts.

Placing of Government orders for five new light cruisers is giving considerable satisfaction in shipbuilding quarters.

Continental business is stagnant. Neither buyers nor sellers are desirous of quoting sterling prices and buyers are not attracted by franc prices. Most works are believed to be well placed, but it is difficult to gage the position accurately. Some Continental merchants are reported in difficulties, owing to the rise in the exchange value of the franc. In Germany the Thyssen group has secured a Swedish order for 8000 tons of rails.

Tin plate is quiet and easier, chiefly on account of the recent drop in the price of tin. Sales have been made down to 24s. 1½d. ($5.29) basis I. C., f.o.b., but some makers still are asking up to 24s. 6d. ($5.37) basis. The minimum agreed price of 23s. 6d. ($5.15) basis is unaltered.

Galvanized sheets are weak on poor Indian demand, but there is fair business in small parcels for other markets except Japan.

Black sheets are easier, the 24 gage being sold at £13 (2.54c. per lb.) f.o.b. Far Eastern specifications are in request, but there is no business; 6 x 3, 13's, 107 lb. are quoted at £20 5s. (3.96c. per lb.) f.o.b.

Easter Holidays and Labor Troubles Hamper British Markets—Railroads the Only Bright Spot

LONDON, ENGLAND, April 17.—As is only natural, the approach of the Easter holidays has somewhat tended to quiet the demand for iron and steel, but at the same time the industrial unrest, in particular the shipyard lockout and the threat of a coal strike, has had a further depressing effect upon the home trade. The result has been that some pig iron producers have found it necessary to reduce their prices, but others have recently booked substantial orders and are in a position to wait for further new business. Most of the works in the North of the Midlands will be closed down for the whole of next week, so that output will naturally suffer, but at present there is little sign of makers being burdened with stocks, as the whole of the material made goes direct into consumption.

Export demand for pig iron has been a feature of particular interest. Continental competition being put out of the running by the appreciation of the franc, Continental consumers have been purchasing here, and large quantities have been sold to Belgium, Luxemburg and Germany. It is anticipated that, when work is resumed after the vacation, the market will regain its old strength and fresh business will continue to come in in volume.

Railroads Dominate Finished Steel

Finished iron and steel is a very dull market; the demand seems to be confined to small parcels, tonnages of the more usual importance being scarcely in evidence. Export buyers apparently are adopting an attitude of hesitancy, anticipating lower values, but, while costs remain as they are, steel makers assert that material reductions are out of the question.

British and Continental Prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.38 per £1, as follows:

Durham coke, delivered	£1	11s.	to	£1	12½s.	$6.79	to	$7.12
Bilbao Rubio ore†	1	4				5.26		
Cleveland No. 1 foundry	4	17½				21.35		
Cleveland No. 3 foundry	4	12½				20.26		
Cleveland No. 4 foundry	4	12				20.15		
Cleveland No. 4 forge	4	11½				20.04		
Cleveland basic	4	12½				20.26		
East Coast mixed	4	19½	to	5	0	21.79	to	21.90
East Coast hematite	4	19	to	5	0	21.68	to	21.90
Ferromanganese	17	0				74.46		
Rails, 60 lb. and up	8	10	to	9	10	37.23	to	41.61
Billets	8	0	to	8	5	35.04	to	36.14
Sheet and tin plate bars, Welsh	8	18¾				39.15		
Tin plates, base box	1	4⅛	to	1	4½	5.29	to	5.37
						C. per Lb.		
Ship plates	9	5	to	9	15	1.81	to	1.91
Boiler plates	13	0	to	13	10	2.54	to	2.64
Tees	9	10	to	10	0	1.86	to	1.96
Channels	8	15	to	9	5	1.71	to	1.81
Beams	8	10	to	9	0	1.66	to	1.76
Round bars, ¾ to 3 in.	10	0	to	10	10	1.96	to	2.05
Galvanized sheets, 24 g.	17	5	to	17	10	3.37	to	3.42
Black sheets, 24 gage	13	0	to	13	5	2.54	to	2.59
Black sheets, Japanese specifications	15	5				2.98		
Steel hoops	12	10	&	12	15*	2.44	&	2.49*
Cold rolled steel strip, 20 gage	17	2½				3.35		

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

	(*Nominal*)					
Foundry pig iron:						
Belgium	£4	4s.	to	£4	5s.	$18.40 to $18.62
France	4	4	to	4	5	18.40 to 18.62
Luxemburg	4	4	to	4	5	18.40 to 18.62
Billets (nominal):						
Belgium	6	0	to	6	5	26.28 to 27.38
France	6	0	to	6	5	26.28 to 27.38
Merchant bars:						C. per Lb.
Belgium	7	0				1.37
Luxemburg	7	0				1.37
France	7	0				1.37
Joists (beams):						
Belgium	6	10 and upward				1.27
Luxemburg	6	10 and upward				1.27
France	6	10 and upward				1.27
Angles:						
Belgium	8	0	to	8	5	1.56 to 1.61
¼-in. plates:						
Belgium	7	15				1.52
Germany	7	15				1.52
⅜-in. plates:						
Luxemburg	7	15				1.52
Belgium	7	15				1.52

The South Australian Government has recently placed a contract for nearly 32,000 tons of rails and fishplates with the Broken Hill Proprietory Co., at a total of £390,000 ($1,710,000). Railroads in this country are busy carrying out their reconstruction schemes and fresh orders for railroad cars, and railroad material in general, are from time to time being placed with various British manufacturers.

GERMAN COMBINES ACTIVE

Iron and Steel Prices Fluctuating, But Employment Improves—Much Price Cutting

BERLIN, GERMANY, April 15.—The death of Hugo Stinnes has brought his work of forming huge industrial combines into the limelight of public discussion again but, even without such a powerful exponent of the idea, necessity is forcing industrial combination. Owing to the economic crisis there is a strong tendency in the engineering industry to combine and several important negotiations are pending.

The working agreement between the Hannoversche Maschinenbau Gesellschaft (Hanomag), and the Bergbau Gesellschaft Lothringen (mines and iron works), which had been contemplated during the last few years, has now been effected, the Lothringen concern having secured the majority of Hanomag stock. The transaction is of considerable importance, as it links one of the largest firms in the locomotive and engineering industry to a mining and iron concern with an enormous coal and coke basis and a developing iron production.

The machinery concern of Otto Wolff, Köln, and the Hommel concern, Mainz (tools and machine tools), have concluded a working agreement. Hommel has acquired from the de Fries Co. (Wolff concern), the Tools Works Köln-Ehrenfeld, and is to have a representative on the board of the Fries, and vice versa. The Böblinger Werft has passed into the possession of the Schwäbische Hüttenwerke (Haniel concern), which intends to erect a steel foundry there. Production is to start in the autumn. The Berlin-Anhaltische Maschinenbau Gesellschaft and the Meguin Gesellschaft, Butzbach, are contemplating a merger under the name of Bamag-Meguin Gesellschaft.

Fusion between the Daimler and the Benz motor companies has been concluded, to last until the end of the year 2000. The main purpose is the exclusion of competition between the two firms. The buying of raw material and the sales of finished products are combined. Profits are pooled and distributed in relation to the working capital of the two companies.

Prices Fluctuating

Generally business in the iron industry continues brisk, competition in the tube market being very keen at present. The works in the occupied area are cutting prices to get back the customers which they lost last year. In this line prices are low and there seems no possibility that the market will improve. Price conventions between manufacturers have been terminated and Mannesmann and Thyssen are also discontinuing their agreement in regard to tube prices. The advance in scrap prices has come to a halt, as prices for new rolled material have remained practically unaltered recently. Works bar iron prices are at about 160 marks per ton (1.73c. per lb), and the traders quote 200 marks (2.16c.).

As the mills are increasing their production there is no fear of a scarcity of supplies in the near future and demand is consequently less urgent. This reaction was to be expected after the excessive buying by traders and consumers recently. The works have, however, orders that will keep them busy far into the summer. As the building industry is now showing a greater demand, the works are regarding future developments with confidence.

Steel scrap is about 88 gold marks ($21.30), best scrap is quoted at 83 to 85 marks ($20.09 to $20.57), and chippings at 65 marks ($15.73) per ton. Payment is to be made by the fifteenth of the month following delivery. Trade in cast iron scrap is quiet. Quotations range between 89 and 92 marks ($21.54 and $22.26) per ton and the Foundry Masters Association has advised its members not to buy at present, as it considers the price unduly high. At its recent meeting this organization decided, however, to increase prices for castings by 12 per cent.

The Pig Iron Association again has raised prices by 3 to 6 marks per ton ($0.73 to $1.45), according to quality. In north and east Germany the increases are smaller, owing to the strong British competition prevailing in those districts. In the south advances of 7 to 9 marks per ton ($1.69 to $2.18) are made. At the Upper Silesian works orders are increasing. Prices are advancing and bar iron is quoted at 150 to 160 marks per ton (1.62c. to 1.73c. per lb.). The South German Central Iron Sales Office at Mannheim is quoting bar iron at 241 marks (2.60c.). Business in rails for mines is brisk.

Employment Better

Generally employment at the engineering works is improving, but prices remain depressed. Manufacturers of tools also are booking more orders lately. There is exceptionally keen competition in this line and tools generally are sold below cost. To procure liquid money many traders are selling their stocks at ridiculously low prices. Demand is not strong, as all consumers are restricting their tool bills and are only cautiously replenishing their stocks, to curtail overhead charges. Orders are therefore of small size and price cutting has assumed alarming dimensions, as price is in many cases considered before quality.

Works manufacturing rolling stock and other railroad material are poorly employed, as the railroads are giving few orders. Another principal customer for tools, the shipbuilding industry, also is not fully employed and has only a reduced demand. Consequently, there is a strong fight for orders in the reduced market and some traders have gone so far as to sell below the price at which they get the tools from the manufacturer, for the purpose of retaining their regular customers. The fight is waged principally between firms not belonging to the manufacturers' organizations and leading traders, but members of the Association of Manufacturers of Drills and Precision Tools also are giving very high rebates, and refuse to supply traders which do business in a way unfair to trade and industry. Some of the large manufacturers have gone so far as to sell at times below cost of production and a large number of outsiders, who entered the trade during the time of the inflation of the mark, already have been forced to drop out and manufacturers are confident that conditions in the tool line will improve during the next few months.

At present business is mainly done in the western districts and on the Ruhr, in Saxony and in South Germany. Export trade with Austria, Luxemburg and Denmark is improving. Polish Upper Silesia is showing an especially strong demand, while France, Belgium and Switzerland, which before 1914 were some of the principal customers for German tools, are placing few orders.

Cancellation of Suspended Rates on Steel Products Ordered

WASHINGTON, April 29.—In a decision announced today the Interstate Commerce Commission ordered the cancellation of suspended railroad rate schedules proposing increased rates on iron and steel products in carloads from St. Louis and Chicago groups and from Fort Wayne, Ind., to various destinations in Indiana and Illinois and on cast iron pipe and fittings in carloads from the Chicago group to destinations in Indiana. The decision held that the proposed increased rates were not justified. The steel products on which it was proposed to increase rates, the St. Louis and Chicago groups, and from Fort Wayne, included among others, bands, bars, rods and boiler plates.

JAPAN AWAITS LOWER PRICES

Depreciated Exchange a Factor in Japanese Trade —Tin Plate Buyers Expect Decline

NEW YORK, April 29.—Export demand is light. There is a fair volume of inquiry but buying is confined to small lots, evidently to satisfy immediate needs. Japanese buyers still are facing the disadvantage of a depreciated currency in making purchases and as a result are placing but little business in the United States. Although American sellers are quoting comparatively low prices on Japanese inquiries, the depreciated yen brings the cost of most iron and steel products to a higher level than prevailed immediately after the earthquake last fall. One-pass, cold-rolled black sheets, 13 to the bundle, at $97 per ton, c.i.f. Japanese port, cost the Japanese buyer about $2 per ton more than the same sheets last fall when $116 per ton was quoted.

There is a keen interest among Japanese buyers as to the probable future of the American market and there is evidently a definite desire to withhold purchases as long as possible in expectation of a further decline, despite the low quotations that have already been made on business for Japan, in some instances as much as 15 or 20 per cent below the domestic Pittsburgh base. This is the usually active season in Japan for purchases of black sheets and tin plate. Tin plate for the canning industry is also generally purchased at about this time for delivery in September or October.

Probably the lowest quotations have been made on bars and shapes, which, it is said, have been offered down to the equivalent of 1.65c. to 1.70c. per lb., base Pittsburgh, although the average quotation is probably nearer 1.85c. to 1.90c. per lb.

Exporters to China have recently quoted on lots of a carload or more of tin plate wasters, second-hand bars and plates, wire shorts, etc. While some business has been booked, firm offers from Chinese merchants are generally too low to interest American sellers. On second-hand plates, for example, offers from China are as a rule $26 to $27 per ton, c.i.f. Chinese port. Scrap dealers and others in possession of such material point out that even under the depressed conditions prevailing in the old material market today, as high as $20 or more per ton could be obtained from domestic buyers, and cut to charging-box size and sold as heavy melting steel, the plates would net them more than if sold for export at these prices.

Recent purchase by Pekin University of radiators and other heating equipment has led some exporters to believe that inquiry for wrought pipe may follow shortly. If proportionate purchases of pipe are made, it is believed the tonnage may be close to 500,000 ft.

Guillermo Zeleston, Box 1171, San Francisco, Cal., is interested in obtaining prices on galvanized sheets, f.a.s. New York, or c.i.f. Port Limon, Costa Rica.

Oglebay, Norton & Co. Reorganized as a Stock Company

Oglebay, Norton & Co., Cleveland, dealers in iron ore, who have been engaged in business as a partnership composed of Earl W. Oglebay, David Z. Norton and Henry K. Bourne, have reorganized as an incorporated company under the laws of Ohio, the new organization becoming effective May 1. There will be no change in the personnel of the organization, as the management will be conducted by the same executives that have been in active charge for several years. With the new organization E. W. Oglebay and D. Z. Norton, the senior member of the partnership, will be in a position to devote less personal attention to the affairs of the organization than heretofore. Both are directors in the new company, but executive offices have been conferred on the younger men of the organization. Crispin Oglebay has been elected president; Rolland C. Allen, first vice-president; Henry K. Bourne, second vice-president; Robert C. Norton, treasurer and Arthur C. Bishop, secretary. The above, with Earl W. Oglebay, David Z. Norton, Arthur E. Danforth and William Wisner White, constitute the board of directors. Ralph H. Weir is assistant secretary.

Oglebay, Norton & Co. are well known in the iron and steel trade, as they have been engaged as iron ore brokers and mine managers since 1889, at which time they succeeded to the business previously conducted under the firm name of Tuttle, Oglebay & Co., which was organized in 1883. The business conducted by this firm was founded over 50 years ago under the name of H. B. Tuttle & Co. The company maintains its principal office in the Hanna Building, Cleveland, and its chief mining office in the Lake Superior iron ore district is located at Ironwood, Mich., and is in charge of E. W. Hopkins, range manager.

The company will act as operating manager of the Montreal Mining Co. and the Castile Mining Co., with mines on the Gogebic Range; the Bristol Mining Co., the Brule Mining Co. and the Fortune Lake Mining Co., with mines on the Menominee Range. The company will sell the products of the above companies as well as the output of several other ore mines. The lake transportation end of the company's business is operated under the name of the Columbia Steamship Co., which owns eight modern steel freighters having a total carrying capacity of 73,500 tons. A new 12,000-ton vessel has been ordered and will be added to this fleet in the spring of 1925.

The company has recently taken over the supervision of the mining operations of the Rosiclare Lead & Fluorspar Mining Co., the largest fluorspar producing company in this country, with mines located at Hardin County, Illinois, and Crittenden County, Kentucky.

Financing Blast Furnace to Be Built at Everett, Mass.

Preliminary financing has been completed for the erection at Everett, Mass., of a blast furnace to make merchant pig iron by the Mystic Iron Works, a subsidiary of the Massachusetts Gas Companies, Boston. The parent company has sold to bankers, who in turn have sold to investors, $5,000,000 coupon three-year 5 per cent notes dated April 15, last. It is planned to do the permanent financing some time during the life of these notes.

The blast furnace will be erected on land adjacent to that of the New England Coal & Coke Co., another subsidiary of the Massachusetts Gas Companies. Testing for foundations has been going on for some time, and plans have been completed for the furnace, stoves, equipment, etc., details of which will shortly be made public. Contracts already have been let for coal handling improvements at the New England Coal & Coke Co. ovens to facilitate its output of fuel. In addition, the parent company, through a subsidiary, recently purchased a fleet of coal-carrying steamers, adapted for the transportation of ores, which, when added to the original fleet, makes the company one of the largest coastwise transportation companies on the Atlantic Coast.

The Mystic Iron Works management contemplates the purchase of foreign as well as domestic ores, and to market its pig iron product outside as well as inside New England. It has an advantage in freight rates into New York over eastern Pennsylvania furnaces.

Coke Ovens Operating at Ironton, Utah

The Koppers-Becker coke ovens of the new plant at Ironton, near Provo, Utah, of the Columbia Steel Corporation have been put into operation. The coke plant is one of 33 units and will serve a 500-ton blast furnace which has been erected at Ironton. Coal is obtained from mines at Columbia, Utah, about 100 miles distant, and the iron ore, to assay 56 to 65 per cent iron, does not have to be hauled over 240 miles. The main plant of the company, making wire, nails and sheets, is at Pittsburg, Cal., but it has plants elsewhere, such as the former Llewellen plant at Torrance, Los Angeles.

STEEL CORPORATION EARNINGS

Extra Dividend on Common Is Declared for Third Time

March Was Best Month—Judge Gary Expresses Confidence in Prosperity, Despite Present Lull in Orders

Report of the United States Steel Corporation for the first quarter of 1924 was made public Tuesday afternoon with the announcement that an extra dividend of ½ per cent on common stock had again been declared, similar action having been taken for the third and fourth quarters of 1923. The showing for the first quarter was a favorable one, with net earnings of $50,075,445 compared with $49,958,980 for the fourth quarter of last year, and only $34,780,069 for the first quarter of last year. The remaining surplus for the quarter was $16,718,624. The statement indicated that the best month of the quarter was March, with earnings of $19,065,475, and January the poorest with earnings of $14,771,103. The usual dividends of 1¾ per cent on preferred and 1¼ per cent on common were declared.

Earnings for the first quarter of 1924 and the three preceding years were as follows:

Quarters	1924	1923	1922	1921
First.....	$50,075,445	$34,780,069	$19,339,985	$32,286,722
Second....	.....	47,858,181	27,286,945	21,892,016
Third.....	.....	47,053,680	27,468,339	18,918,058
Fourth...	.....	49,958,980	27,552,392	19,612,033
		$179,650,910	$101,647,671	$92,708,827

Judge Gary's Comments

Judge Gary received members of the press and talked at length in regard to business conditions. He said that there is no good reason for the present somewhat unfavorable condition of business. That there has been a tendency toward depression cannot be denied, but he believed that fundamental conditions were never better and he would be disappointed if business does not improve before election. He said that on April 1 new business of the Steel Corporation was about 10 per cent less than it had been a few weeks earlier, and that at present new orders are about 5 to 10 per cent less than they were a month ago.

As to dividends, Judge Gary said that, as stated in his address at the annual meeting, the directors had felt justified in putting the common stock on a 5 per cent basis several years ago, and that if further dividends were justified they would be made in the form of extra dividends. As to prices, he said the policy of the Steel Corporation is to promote stability, which does not mean to reduce or increase prices simply because it can be done. The policy is to make the changes upward when justified, and downward when compelled to meet competition—following others and not leading in price reductions or in reduction of wages. The policy is to lead in advancing wages. In reply to a question, he said that no demand for higher wages had been made. He paid an earnest tribute to the men of the Steel Corporation, who in spite of being urged to go on strike during the war, had kept employed, enabling the corporation to operate to full capacity. Judge Gary spoke in terms of great confidence as to the prosperity of the country. He said that God Almighty had given advantages to this country over other countries. "Have faith in your country," he said. "The United States will not go into the hands of a receiver if any other country on earth can live."

He said that he believed that the overwhelming sentiment of the country would be in favor of electing a President of the United States according to the best interests morally and materially of the people, and that partisan considerations would not govern.

Earnings for First Quarter

	Earnings Before Charging Interest on the Subsidiary Companies' Bonds Outstanding	Less: Interest on the Subsidiary Companies' Bonds Outstanding	Balance of Earnings
January, 1924.....	$15,456,868	$685,765	$14,771,103
February, 1924....	16,923,374	684,507	16,238,867
March, 1924.....	19,749,497	684,022	19,065,475
	$52,129,739	$2,054,294	
Net earnings			$50,075,445
Less charges and allowances for depreciation, extraordinary replacement and sinking funds on bonds of subsidiary companies		$10,794,109	
To sinking funds on U. S. Steel Corporation bonds		2,480,863	
			13,274,972
Net income			$36,800,473
Deduct: Interest for the quarter on U. S. Steel Corporation bonds outstanding		$4,631,637	
Premium on bonds redeemed		250,000	
			4,881,637
Balance			$31,918,836
Dividends on stocks of the United States Steel Corporation, viz.:			
Regular—Preferred, 1¾ per cent		$6,304,919	
Common, 1¼ per cent		6,353,781	
		$12,658,700	
Extra—Common, ½ per cent		2,541,512	
			15,200,212
Balance of surplus for the quarter			$16,718,624

Italy's Iron and Steel Output in 1923

Provisional figures of Italian iron and steel production in 1923 show the output of pig iron was 247,000 metric tons, compared with 158,000 in 1922 and 471,000 in 1917; that of raw steel was 1,122,000 tons, compared with 981,000 tons in 1922 and 1,332,000 tons in 1917. While the pig iron production is still considerably below the pre-war average, steel manufactured since the armistice by utilizing large quantities of scrap is about at the pre-war level, Commercial Attaché H. C. Mac Lean, Rome, reports to the Department of Commerce.

To Further Trade Relations with Germany

The Board of Trade for German-American Commerce, Inc., has recently been formed "for the purpose of reestablishing and furthering trade between the United States and Germany." The board of directors of the board includes: Carl M. Bernegau, vice-president Keuffel & Esser; Karl Eilers, August Eimer, president Eimer & Amend; Dr. K. G. Frank, Siemens-Rhein-Elbe-Schuckert Union; Hans Hinrichs, president Hans Hinrichs Chemical Corporation; Paul G. Leoni, president Iron and Ore Corporation of America; Herman A. Metz, president H. A. Metz & Co., Inc.; Richard C. Schilling, president American Mercedes Co., Inc., all of New York. Robert C. Mayer, 60 Broadway, New York, is secretary.

Safety Conference at Cleveland

At the joint safety conference to be held in Cleveland May 16, under the auspices of the engineering section of the National Safety Council, the Cleveland Engineering Society, and the Society of Ohio Engineers, William Fitch, the Fisher Body Ohio Co., Cleveland, will preside at the morning session; Rodney Morison, Jr., National Carbon Co., at the afternoon session, and Frank A. Scott, president the Warner & Swasey Co. and of the Cleveland Engineering Society at the dinner in the evening. Among the papers which will be read will be:

"Development of Ohio's Workmen's Compensation Law and Codes," John Patterson, Hydraulic Pressed Steel Co.

"Application of the New Penalty Clause of the Compensation Law," J. M. Woltz, Youngstown Sheet and Tube Co., president Society of Ohio Safety Engineers.

"Floor Plans with Regard to Aisles, Machines, Material and Men," E. W. Hulet, consulting engineer, Cleveland.

Iron and Steel Markets

CONSUMERS LESS ACTIVE

Further Contraction in Demand for Steel, with Prices Weakening

Output Now About 20 Per Cent Below the Peak—New Buying Meager

The shrinkage in iron and steel output, which had been continuous throughout April, was more rapid in the final week. For the industry as a whole the decline from the peak in March has been close to 20 per cent, steel ingot production today being estimated at about 40,000,000 tons a year, as against 50,000,000 tons at the high point seven weeks ago.

Early in April the falling off in orders was laid to price cutting, resulting from overproduction, and to buyers' expectation of lower steel later. It is now apparent that consuming industries are somewhat less active and therefore that stocks on hand will last longer.

In respect to prices the situation is that the cuts that only recently were made quietly and were considered exceptional are now generally recognized. In plates, shapes and bars the recession in ordinary transactions is $4 to $6 a ton from the February levels, so that 2.25c., Pittsburgh, is usual on bars and shapes, while competition on plates has made 2.20c. a common price.

A further decline has come in sheet prices, as well as in hoops and in bolts and nuts.

Steel producers are generally following the procedure of last year in adjusting their operations to demand and there is no indication of efforts to get orders by drastic cuts. Cancellations are exceptional and suspensions are light, seeing that many consumers are urging quick deliveries for their bare needs.

Conceding that the present quietness may continue into June, steel companies point out that with all buyers following the same policy, production may soon fall below requirements and replenishment buying become the decisive factor.

Railroads are taking good-sized rail and track supply shipments from the mills, but little additional rail business is looked for until late in the year. The Denver & Rio Grande has just placed 10,000 tons with the Colorado mill.

The bulk of the year's railroad car business is considered to be now on the books of the builders. On some of this deliveries of steel will be spread over several months.

Some lines of manufacture connected with building show slackening. Chicago reports recession in radiator output and the metal bed industry is now running at 65 per cent of capacity.

Farm implement makers, who put into their product steel costing more than it costs today, now find farmers asking reductions in line with the decline in the steel market.

There is some revision of the original estimate that all the tin plate that could be turned out would be needed this year. Late planting has delayed contracts for food containers, and tin plate mills are cutting down output because storage space has been used up.

The general average of wire mill operations is probably not over 50 per cent. Stock accumulated some weeks ago in anticipation of a spring movement are being drawn upon, but buyers are ordering on the most limited scale.

The week's bookings of structural steel work amounted to 27,000 tons. Last week they were 20,000 tons, and the weekly average since the first of the year for the larger projects as reported in THE IRON AGE does not exceed 28,000 tons. Fresh work appearing calls for 24,000 tons, about one-fourth less than the rate at which it has been offered since December. Chicago, Pittsburgh and Cleveland find some lessening in building activity.

In the present trend of prices and demand bar iron manufacturers in the Middle West are expected to refuse the $3 per ton advance asked by puddlers. Similar advances in sheet and tin plate scales will be contested.

Pig iron has declined 50c. at Chicago and at nearly all centers the market is so dull that prices are untested. Favorable features are the heavy shipments and the appearance of very little resale iron, but foundry operations, taking the country through, are somewhat less. The blowing out of a number of merchant blast furnaces is expected to check the downward tendency of prices.

In the Pittsburgh district six more blast furnaces, chiefly steel company stacks, were blown out in the past week and six others will stop within a few days. In the Pittsburgh and nearby districts 95 furnaces are now going as against 114 in March.

Falling prices have reduced THE IRON AGE composite figure for finished steel to 2.653c. per lb., the lowest since February, 1923. One year ago it was 2.824c., the highest point since February, 1921.

The pig iron composite has dropped from $21.96 last week to $21.88, the lowest of the year, and $1 below the level of two months ago. One year ago it was $30.79 and two years ago $22.23 per ton.

Pittsburgh

Production Curtailed as Buying Decreases—Scrap Prices Firmer

PITTSBURGH, April 29.—The drift of the steel market is downward, viewed from any angle. Buyers still have the whiphand, and having few, if any, doubts about their ability to secure supplies when they need them, they continue to take only the merest requirements. Comparatively few of the manufacturers having any considerable amount of backlog business, there is naturally a keen desire for orders and the result is seen in further decline in prices of the heavy tonnage prod-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Apr. 29, 1924	Apr. 22, 1924	Apr. 1, 1924	May 1, 1923
No. 2X, Philadelphia‡	$22.76	$22.76	$23.26	$32.76
No. 2, Valley furnace†	*21.00*	21.50	22.50	31.00
No. 2, Southern, Cin'ti†	26.05	26.05	26.55	31.05
No. 2, Birmingham, Ala.†	22.00	22.00	22.50	27.00
No. 2 foundry, Chicago*	*23.50*	24.00	24.50	32.00
Basic, del'd, eastern Pa.	21.50	21.50	21.50	30.25
Basic, Valley furnace	*21.00*	21.50	21.75	31.00
Valley Bessemer del. P'gh.	24.26	24.26	24.76	32.77
Malleable, Chicago*	*23.50*	24.00	24.50	32.00
Malleable, Valley	21.50	21.50	22.50	31.00
Gray forge, Pittsburgh	*22.26*	22.76	23.76	32.27
L. S. charcoal, Chicago	29.15	29.15	29.15	36.65
Ferromanganese, furnace	107.50	107.50	107.50	125.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	45.00
O.-h. billets, Pittsburgh	40.00	40.00	40.00	45.00
O.-h. sheet bars, P'gh.	41.00	41.00	42.50	45.00
Forging billets, base, P'gh.	45.00	45.00	45.00	55.00
O.-h. billets, Phila.	*43.17*	45.17	45.17	50.17
Wire rods, Pittsburgh	51.00	51.00	51.00	51.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.25	2.25	2.30	2.50
Light rails at mill	2.00	2.00	2.00	2.25

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.52	2.52	2.52	2.825
Iron bars, Chicago	*2.30*	2.35	2.40	2.60
Steel bars, Pittsburgh	*2.25*	2.30	2.30	2.40
Steel bars, Chicago	2.35	2.35	2.40	2.84
Steel bars, New York	*2.59*	2.64	2.64	2.74
Tank plates, Pittsburgh	*2.20*	2.30	2.30	2.50
Tank plates, Chicago	2.45	2.45	2.60	2.84
Tank plates, New York	2.54	2.54	2.54	2.84
Beams, Pittsburgh	*2.25*	2.30	2.30	2.50
Beams, Chicago	2.45	2.45	2.60	2.84
Beams, New York	2.59	2.59	2.59	2.84
Steel hoops, Pittsburgh	2.90	2.90	2.90	3.30

Sheets, Nails and Wire,	Apr. 29, 1924	Apr. 22, 1924	Apr. 1, 1924	May 1, 1923
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	*3.60*	3.70	3.75	4.00
Sheets, galv., No. 28, P'gh.	4.85	4.85	4.90	5.25
Sheets, blue an'l'd, 9 & 10	2.85	2.85	2.90	3.25
Wire nails, Pittsburgh	3.00	3.00	3.00	3.00
Plain wire, Pittsburgh	2.75	2.75	2.75	2.75
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.80
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$6.00

Old Material, Per Gross Ton:				
Carwheels, Chicago	*$16.00*	$16.50	$17.00	$26.00
Carwheels, Philadelphia	17.00	17.00	18.50	25.00
Heavy steel scrap, P'gh.	15.50	15.00	17.50	24.50
Heavy steel scrap, Phila.	15.00	15.00	16.00	22.00
Heavy steel scrap, Ch'go.	13.50	13.50	15.00	21.50
No. 1 cast, Pittsburgh	18.00	18.00	19.00	27.00
No. 1 cast, Philadelphia	17.00	17.00	18.50	25.00
No. 1 cast, Ch'go (net ton)	18.00	18.00	19.00	25.00
No. 1 RR. wrot. Phila.	*17.00*	17.50	19.00	25.00
No. 1 RR. wrot. Ch'go (net)	12.25	12.25	13.00	20.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.75	$3.75	$3.75	$6.00
Foundry coke, prompt	4.75	4.75	4.75	7.00

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*13.62½*	13.75	13.75	16.62½
Electrolytic copper, refinery	*13.12½*	13.25	13.37½	16.37½
Zinc, St. Louis	*6.00*	6.12½	6.22½	6.80
Zinc, New York	*6.35*	6.47½	6.57½	7.15
Lead, St. Louis	*7.50*	7.62½	8.70	7.60
Lead, New York	7.87½	7.90	9.00	7.75
Tin (Straits), New York	*48.25*	49.50	50.62½	45.25
Antimony (Asiatic), N. Y.	*9.00*	9.87½	11.75	7.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, April 29, 1924, Finished Steel, 2.653c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

April 22, 1924,	2.696c.
April 1, 1924,	2.703c.
May 1, 1923,	2.810c.
10-year pre-war average,	1.689c.

Composite Price, April 29, 1924, Pig Iron, $21.88 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

April 22, 1924,	$21.96
April 1, 1924,	22.59
May 1, 1923,	30.79
10-year pre-war average,	15.72

ucts, in sheets, in hoops, in bolts and nuts and not quite as much strength in other finished products as was the case earlier in the year.

In view of the fact that the week has seen a further recession in steel ingot production, it is apparent that price concessions are not an effective means of stimulating demand. It is doubtful whether ingot production in this and nearby districts, including the Steel Corporation, which still is enjoying a relatively high rate this week, is as much as 70 per cent of capacity. This would indicate a recession of 20 per cent from the March peak and that the current rate is about 40,000,000 tons a year.

Six more blast furnaces have been blown out or banked in this and nearby districts in the past week, and before the end of the week it is probable that six others will cease production. Still lower prices also have appeared in pig iron, in the effort of producers to find a trading level. Curtailment of coke production has been without effect on prices and the coal market remains favorable to buyers, notwithstanding a very low rate of output.

The one constructive development of the week is that scrap prices have stopped declining and in some grades the market is definitely firmer. Scrap, however, still is too low in price to be a healthful influence on finished steel prices.

Backwardness of the season continues to exact tribute from the steel industry. It was believed at the beginning of the year that there would be a demand for tin plate sufficient to absorb all that possibly could be produced, but because the planting season was delayed there has not yet been a demand for food containers and the makers of the latter have been forced to reduce their takings of tin plate to such an extent that the tin mills are now cutting down production because of the exhaustion of storage space. The weather factor in the sale of automobiles and in the consequent demand for steel from the automotive industry is well known. Incidentally the sale of stocked cars has not been sufficiently heavy to encourage the manufacturers to increase their production schedules and the belief gains ground that the first quarter rate of output will not be attained again until late this year. The weather has been something of a factor in building construction, although labor costs are probably the chief restrictive

influence upon this situation. Pittsburgh and its environs have so little work in sight that local fabricating shops have to go far afield to find business and evidently the same condition exists elsewhere, since local shops are finding outside shops coming into this district. The railroads are suffering from the unusually small movement of coal, to say nothing of the lighter movement of other kinds of freight, and there seems to be much doubt that railroad equipment purchases over the remainder of the year will be as heavy as they were in the first quarter.

In the face of such prospects, however, there are a good many well informed observers who are confidently looking for a decided betterment in business by the middle of the year. It is pointed out that with buying on a tapering scale, there must soon come a time when consumers and distributors will have to be freer buyers and that any excess of supply over demand will find speedy correction in the recession of production now in progress.

Pig Iron.—The market still is inactive, notwithstanding that producers have further reduced prices in an effort to create demand. A Cumberland, Md., maker of tin plate recently inquired for 1000 to 1500 tons of basic pig iron and is reported to have closed for most of this tonnage at a delivered price well below $23. The assumption is that the iron will be shipped from a western Pennsylvania furnace having a freight rate to Cumberland of about $2 a ton. This business was placed in Philadelphia. A local railroad car builder recently bought 500 tons of low silicon, low phosphorus basic pig iron at $21, Valley furnace, and in view of the fact that this particular tonnage was of an analysis very difficult of attainment and that it was secured at $21, would indicate that the market on standard grade is not above that level. Indeed, merchant furnaces as a rule would be glad to sell at that price which was paid for 500 tons recently sold by a Youngstown steel company for shipment to Warren, Ohio. Bessemer iron holds at $22.50, Valley furnace, but that price is supported only by small lot sales. While there have been occasional sales of single carloads of foundry iron at $22, the common asking price of producers now is $21.50, and they would go to $21 to meet that price which has been named by middlemen.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$21.00
Bessemer	22.50
Gray forge	$20.50 to 21.00
No. 2 foundry	21.00 to 21.50
No. 3 foundry	20.50 to 21.00
Malleable	21.50 to 22.00
Low phosphorus, copper free	29.00

Ferroalloys.—The situation here is without important change. Business is light, with consumers taking on only their merest requirements. Prices are unchanged, but there are two ways of looking at that statement. There is not enough business in sight to tempt producers to cut prices in an effort to stimulate sales and supplies are not needed badly enough to encourage lower bids by consumers. Prices are given on page 1317.

Semi-Finished Steel.—Trading still is of such limited proportions that the discernment of any change in prices is difficult. It is well established that sheet bars are not above $41, Pittsburgh or Youngstown, but positive evidence that less can be done waits on the development of some business. Nonintegrated sheet makers as a general rule are not getting enough business to be able to specify at all freely and producers of sheet bars having their own mills have surplus production despite the recent slowing down in steel works. The common quotation on billets and slabs remains at $40, but there are suggestions that mills which have had suspensions from contract customers would be willing to entertain lower prices for early shipments. The market in a large measure is untested on forging billets, pipe skelp and wire rods. There has been a further recession in ingot production in this and nearby districts, and, taking in the Steel Corporation, it is doubtful whether the general average now is as much as 70 per cent of capacity. Prices are given on page 1317.

Wire Products.—While some producers note a slight improvement in specifications and orders, this is hardly typical of the industry as a whole, and those reporting the gain are inclined to ascribe it to the supply condition of their own customers rather than to a betterment in the general situation. The spring has been so late and wet that the farmers are disposed to let their pessimism affect their purchases, and the backwardness of the season also has told on building operations and the demand for nails. The market still is weak on coated nails and it is reported that a price of $2.65 base recently came out on plain wire. Generally, however, recent prices are holding except in competitive territory, in which Pittsburgh mills are at least equalizing freights. Prices are given on page 1316.

Steel Rails.—Practically no market exists for light rails and prices are nominal and untested.

We quote light rails: rolled from billets, 2c. base (25-lb. to 45-lb.); rolled from rail steel, 1.85c. to 1.90c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Tubular Goods.—Jobbers of merchant pipe still have rather big stocks and their efforts to lighten them, even at the expense of profits, not having been highly successful, they are not specifying with much freedom against mill contracts. Oil country jobbers are ordering out pipe fairly freely and actually the mills now are busier on this class of pipe than on merchant goods. The backlog of line pipe business ordinarily on the mill books at this time of the year is lacking this year, such orders as have come out having been promptly filled. The National Tube Co. recently took 75 miles of 8-in. pipe and a Youngstown maker 35 miles of 6-in. pipe for export. There was 5700 tons in the larger order and 1700 tons in the smaller one. Boiler tubes still are dull and weak, with actual selling prices well below those indicated by the published discounts. Discounts are given on page 1316.

Sheets.—Paucity of demand is not relieved by the willingness of some of the smaller producers to go pretty low on price to secure orders and there has been a further slowing down of mill operations, which for the industry as a whole do not average as much as 60 per cent this week. Pressure for business in black sheets is particularly heavy and as low as 3.50c. base has been named by some makers to stir up business. One of the General Motors Corporation units is understood to have increased its sheet specifications, but the automotive industry generally has not progressed sufficiently in the disposal of stocked cars to greatly increase producing schedules or steel purchases. The American Sheet & Tin Plate Co. has not yet followed the reduction in automobile body sheets by independent makers as of April 22. This interest appears to be waiting on evidence of the existence of a real demand before changing any of its price schedules. Prices are given on page 1316.

Tin Plate.—Exhaustion of storage facilities has forced a further curtailment of production by the leading interest. The wet and backward spring has served to check the demand for cans for perishable foods and in turn to check the demand of the can makers upon the mills for tin plate. With the mills gaited at a high rate, as they have been for some time, the warehouses have become clogged and a cut in production was necessary. This is seen in a reduced number of turns rather than in mill suspensions, although the latter course is a possibility unless there is any early improvement in the crop outlook, since most manufacturers are inclined to avoid building up stocks against a future demand. American Sheet & Tin Plate Co. is expected to announce its third and fourth quarter prices this week and the common belief is that the present price of $5.50 per base box will be continued.

Cold-Finished Steel Bars and Shafting.—This line is very quiet, largely on account of the continued lack of demand from the automotive industry, which is not readily made up by other consuming industries. Actually, the latter are just as sparing buyers as are the automobile parts makers. Sales of cars are re-

ported to have increased, but evidently not to a point which justifies any increase in production. Based on current steel business from the automobile industry, general production is not more than 50 per cent of the recent peak. There is pretty firm adherence to a base of 3c. Pittsburgh by local makers, the decline in hot-rolled bars not yet having been sufficient to reduce their costs. It is asserted that there is more insistence upon the extra of $3 a ton for screw stock quality than was the case when the base price was higher. Ground shafting holds at 3.40c. base mill for lots of a carload or more.

Hot-Rolled Flats.—A price of 2.75c. lately has appeared on hoops, which for some time resisted the downward tendency of other products under this heading. Bands have been available for some time at 2.75c. and that also is the price that makers are trying to maintain on strips, although they are not altogether successful, especially on the wider sizes, in which competition for orders still is rather sharp. Strip makers depending upon the automotive industry for the bulk of their bookings still find business very slack, but those serving a diversified trade note a slight betterment in orders. Prices are given on page 1316.

Cold-Rolled Strips.—This product still suffers in demand from the curtailed rate of automobile production, but there is reasonably close observance of the regular price of 4.75c. on the small lots that are sought. Local makers claim they are not cutting this price, although they are hearing of lower prices in other districts.

Bolts, Nuts and Rivets.—Lower prices for bolts and nuts recently announced from Cleveland are being met by local producers. There is not enough business passing for them to take an independent stand. Heavy rivets are still priced at $2.75 base per 100 lb., but that price is on small lots only and on larger inquiries $2 to $3 a ton less is being quoted. Prices and discounts are given on page 1316.

Plates.—This product is subject to greater selling pressure than probably any other on the list. Local mills deny having gone below 2.25c. base in this territory, but there is not much business in this district and in going outside they are obliged to meet local competition which has often resulted in a quotation of less than 2.25c. Tank builders have figured on a large number for the McCorkle Line Pipe Co., but action on these tanks still is deferred. Boiler makers are buying very sparingly. It is reported that Eastern plate makers have sought orders in northeastern Pennsylvania and named prices as low as 2.15c., Pittsburgh. Prices are given on page 1316.

Track Supplies.—Railroads are specifying fairly freely on old orders, but new buying is limited. Makers here, who have been quoting small spikes at $3.50 base per 100 lb., have lowered the price to $3.40, but even that price is not producing business, since some outside makers are taking business at $3.25. Tie plates seem to have settled at $51 per net ton. Prices are given on page 1316.

Iron and Steel Bars.—The market here for steel bars has definitely settled to 2.25c., base, for the more attractive tonnages developing within the area where Pittsburgh mills have the advantage of freight over outside districts. There are quotations of 2.30c., but only small tonnages are involved. Iron bars are holding at recent prices, but sales are very light.

Structural Material.—Heavy structural shapes now are quoted by leading makers in this district at 2.25c. to 2.30c. for delivery within the so-called Pittsburgh area. Not much structural business is developing for local shops and the demand upon the mills is correspondingly light. Prices are given on page 1316.

Coke and Coal.—Further curtailment of coke in the Connellsville district has been accompanied by a further decline in the demand, and prices hold at about the recent levels. Demand, however, seems to be slipping a little faster than the production, and $3.75 per net ton at ovens now is the maximum price on furnace grade. Standard foundry coke holds at $4.75 to $5.25 for most brands, and supplies are ample at those prices. One large producer of this grade within the past week has revised contract prices down from $6.50 to $5.75, and is naming that figure on prompt shipments, in open-top cars. The coal market is as dull and depressed as ever. Although as high as $2 per net ton at mine was asked for mine run steam coal, the prevailing range is from $1.50 to $1.75. Mine run coking coal is quoted from $1.75 to $2 and gas coal from $2 to $2.25, but most of the business is at the lower figures. Slack still is scarce and firm in price at from $1.50 to $1.75.

Old Material.—The market still is inactive, but is firmer on the open-hearth grades, because there is less selling pressure on the part of dealers and there are signs that some of the steel makers would take on supplies if they could do so without sending up the market on themselves. With steel works operations on the decrease, any demand that might now develop would be for the purpose of reducing price averages. The market is dull and weak on the lighter grades of material, such as turnings and borings, but small sales of compressed sheets have been made to consumers at $14 and $15, as against the recent nominal range of $13 to $13.50. Heavy melting grade is not quotable below $15.50 this week, since there are no dealers who would sell for less and some mills would pay that to secure a tonnage, which probably could not be had at less than $16.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$15.50 to $16.00
No. 1 cast, cupola size	18.00 to 18.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	18.00 to 18.50
Compressed sheet steel	14.00 to 15.00
Bundled sheets, sides and ends	13.00 to 13.50
Railroad knuckles and couplers	17.50 to 18.00
Railroad coil and leaf springs	17.50 to 18.00
Low phosphorus blooms and billet ends	18.50 to 19.00
Low phosphorus plate and other material	18.00 to 18.50
Railroad malleable	15.50 to 16.00
Steel car axles	17.50 to 18.00
Cast iron wheels	16.50 to 17.00
Rolled steel wheels	17.50 to 18.00
Machine shop turnings	11.00 to 11.25
Sheet bar crops	16.00 to 16.50
Heavy steel axle turnings	14.50 to 15.00
Short shoveling turnings	12.00 to 12.50
Heavy breakable cast	15.50 to 16.00
Stove plate	13.50 to 14.00
Cast iron borings	12.00 to 12.50
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	15.50 to 16.00

Building Experimental Furnace

BIRMINGHAM, ALA., April 28.—The Southern Metallurgical Co., Inc., recently incorporated here by Y. A. Dyer, D. G. Ewin, G. T. Galloway, Cad Jones, J. Wiley Logan and G. C. Starcher, with authorized capital of $40,000, has begun work on a small blast furnace at Cave Springs, Ga., near the Alabama line, to make experiments with a new patent gotten out by Y. A. Dyer in iron making. An offer of $25,000 was made for the patent but declined.

Patent litigation over methods of removing hard refractory cores from hollow drill steel has recently been decided in the United States Circuit Court of Appeals in Philadelphia in favor of the Heller Brothers Co., Newark, N. J. In the manufacture of hollow drill steel, the practice is to bore a hole in the billet. This is filled with refractory material, such as silica, the ends are plugged and the steel rod is rolled, reducing the bore and making the core exceedingly hard. The Heller Brothers Co. used apparatus for this purpose in which compressed air was employed, the tube conveying the air being rotated against the end of the core to be removed. The decision is that the Heller company does not infringe the patented process of employing a forced air blast.

Chicago

Little Buying of Finished Materials—Pig Iron Prices Decline

CHICAGO, April 29.—The week has been an exceptionally quiet one in practically all departments of the iron and steel market. The recent decline in prices has encouraged buyers to delay their purchases and in some cases to hold back specifications against contracts. As a rule, however, cancellations are the exception and suspensions are comparatively light. New orders are of the hand to mouth variety and are generally accompanied by requests for quick shipment.

Stocks in the hands of users are light, but buyers are not interested in accumulating reserve materials so long as early deliveries are available from the mills. At the same time, it is becoming apparent that industrial activity as a whole is commencing to lose impetus and supplies on hand are extending further than formerly. Even lines of manufacture identified with the building industry have been affected. The production of metal beds, which one would suppose would be at a high rate in view of large scale residential construction, has dropped to about 65 per cent of capacity. Radiator makers have also suffered some recession in business. Demand for direct consumption goods has commenced to decline generally, although the actual diminution in buying up to date has not been large. At the same time, some unemployment is making its appearance here and there. On the other hand, the automobile industry, which was the first to suffer reaction, is encouraged by sales of passenger cars which have followed the arrival of mild weather. This has been reflected in steel mill bookings by slightly better orders from some of the accessory manufacturers.

Agricultural implement makers are again in a depressed state of mind because of the drop in steel prices. Their products now in dealers' hands were manufactured from material bought at higher levels and yet the farmers expect reduced prices commensurate with the decline in steel.

Steel producers, while recognizing the change in the market situation, believe that buyers may overestimate the extent of the recession in business. They see no important change in fundamental conditions and attribute slackening trade to psychological causes. In the first place, the Congressional investigation disturbed confidence and to this has been added the adverse effect of Washington's failure to make expected tax reductions. This last factor alone has delayed large investments in business enterprises. On the other hand, the railroads are expected to come into the market again for large quantities of equipment, although this may not eventuate until the third quarter, and it is felt that building will continue to develop on a large scale notwithstanding the recent tendency to postpone or abandon some projects. Looking farther ahead, it is believed that the economic stability of Europe which is expected to follow the acceptance of the Dawes report will put business in this country on a sounder basis by tending to restore agriculture, the copper industry and other lines of business which are normally dependent on exports to a more evenly balanced relationship to American industry as a whole.

Steel output in this district has declined but still averages well over 80 per cent. Two steel works blast furnaces at South Chicago have been blown out for relining, while a third has been banked.

Pig Iron.—In a quiet market, Northern iron has receded to $23.50, base, furnace. The stocks of melters are low, but reduced activities in their plants are making their supplies last longer. At the same time it is probable that an expectation of still lower prices is discouraging buying even more than reduced needs. In fact, April shipments from furnaces, while not so heavy as those for March, which were the largest in a year, were of surprising proportions. It is also significant that there have been practically no cancellations, suspensions have been relatively few and little resale iron has appeared on the market. Reduced costs of furnaces resulting from the decline in ore have undoubtedly been overestimated by buyers. It is pointed out that the 80c. cut in ore does not mean a reduction of $1.60 in the cost of pig iron because reduced operations are causing a corresponding curtailment in coke output, thereby adding to the cost of coke. Few orders of any consequence have been placed during the week. Perhaps the largest was 500 tons of off iron bought by a local melter. Another Chicago user is inquiring for 1000 tons of foundry, while a sewing machine maker in western Illinois is in the market for 300 tons of foundry for prompt shipment. A steel foundry in this district is inquiring for 300 to 500 tons of low phosphorus for May and June delivery.

Quotations on Northern foundry, high phosphorus, malleable and basic irons are f.o.b. local furnaces and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or, when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$29.15
Northern coke, No. 1, sil. 2.25 to 2.75	24.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	23.50
Malleable, not over 2.25 sil.	23.50
Basic	23.50
High phosphorus	23.50
Southern No. 2	$28.01 to 28.51
Southern No. 2 (barge and rail)	24.68
Low phos., sil. 1 to 2 per cent, copper free	30.50 to 31.00
Silvery, sil. 8 per cent	37.29
Electric ferrosilicon, 14 to 16 per cent	45.42

Ferroalloys.—Except for a few carlot sales of ferromanganese, the market has been devoid of activity.

We quote 80 per cent ferromanganese, $115.06, delivered; 50 per cent ferrosilicon, $75, delivered; spiegeleisen, 18 to 22 per cent, $42.56 to $43.56, delivered.

Cast Iron Pipe.—With one or two exceptions, pipe shops are well booked as a result of liberal buying by industrial companies and the larger municipalities during the past winter. The lateness of the spring, however, has delayed purchases by the smaller cities as well as orders from the large municipalities for summer laying. Prices are slightly easier as indicated by a narrower spread in current bids. Chicago takes bids May 8 on 920 tons of 6-, 8- and 12-in. and 740 tons of 30-in. The United States Cast Iron Pipe & Foundry Co. will furnish 450 tons for Litchfield, Ill. Owosso, Mich., has placed 190 tons with National Cast Iron Pipe Co.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $60.20 to $61.20; 6-in. to 10-in., inclusive, $56.20 to $57.20; 12-in. and above, $55.20 to $56.20; class A and gas pipe, $5 extra.

Plates.—The steel for the Chesapeake & Ohio cars is still unplaced and no action has yet been taken on pending inquiries for oil storage tanks. Prospective business includes a car ferry for the Pere Marquette involving 2500 tons. On the whole, demand for plates during the week has been exceedingly light. Going prices do not appear to be higher than 2.45c., Chicago.

The mill quotation is 2.45c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Structural Material.—Both lettings and inquiries for fabricated material have fallen off and locally a considerable tonnage of pending work is being held up because of possible labor troubles. The steel for the Lake Shore Athletic Club, involving 7000 tons, has not yet been placed, although early action on it is expected. The largest award for the week was 4200 tons for two harbor sheds at Los Angeles, which went to the American Bridge Co. Prominent among prospects is the Roosevelt Hotel, New Orleans, requiring 4000 tons. Except on small tonnages, plain material is not commanding more than 2.45c., Chicago.

The mill quotation on plain material is 2.45c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Bars.—Soft steel bars are no longer quotable at more than 2.35c., Chicago, while on bar iron as low as 2.30c. has been done. Buying is light and here and there small quantities of resale material have appeared. There have been no cancellations, however, and suspensions are relatively few. A disappointing demand for fence posts and a reduction in bed manufacture are among the factors which have adversely affected the hard steel bar market. On rail steel bars as low as 2.20c., mill, has been quoted.

Mill prices are: Mild steel bars, 2.35c., Chicago; common bar iron, 2.30c. to 2.35c., Chicago; rail steel, 2.20c. to 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting are 4c. for rounds and 4.50c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.60c. base; hoops, 4.45c.; bands, 3.95c.

Sheets.—Specifications are exceedingly light and new business is restricted. Weakness in prices has apparently frightened buyers out of the market. The leading producer, however, has made no change in its quotations. Current Japanese inquiries are not resulting in business.

Mill quotations are 3.65c. to 3.85c. for No. 28 black, 2.85c. to 3c. for No. 10 blue annealed and 4.85c. to 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago: 4c. for blue annealed; 4.70c. for black and 5.60c. for galvanized.

Wire Products.—Buyers are limiting their purchases to the barest of immediate needs, but are pressing the mills for quick shipments against such orders as they are placing. The general average of mill operations probably does not exceed 50 per cent. Prices are being shaded here and there, but there have been no general reductions. In fact, it is doubtful whether lower prices would bring in much additional tonnage. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1316.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, 3.65c. to 3.80c. per 100 lb.; cement coated nails, 3.10c. to 3.25c. per keg.

Reinforcing Bars.—The placing of 1500 tons for the New Palmer House, Chicago, has again been postponed, this time to the week of May 5 and action on a number of other large tonnages has also been delayed. This is not surprising, in view of the recent decline in the market. Barring some slackening in the hotel and apartment fields, building activity is still on an encouraging scale, but work is being delayed in some cases until steel prices stabilize and in other instances because increasing difficulty has been encountered in financing projects. Local warehouse prices have dropped to 2.60c., Chicago. Recent lettings include:

Brown-Camp Hardware Co. building, Des Moines, Iowa, 400 tons to Kalman Steel Co.

Illinois State highway work, 250 tons to Concrete Steel Co.

Illinois State highway work, 200 tons to Kalman Steel Co.

Indiana highway work, 110 tons to Concrete Steel Co.

Norfolk & Western Railroad coaling station, Prichard, Va., 100 tons to Kalman Steel Co.

Lutheran Deaconess Hospital, Chicago, 100 tons to Concrete Steel Co.

Filtration plant, Portage, Wis., 100 tons to Concrete Steel Co.

Minnesota road work, 100 tons to Kalman Steel Co.

Pending business includes:

Weissmore apartment building, Chicago, 135 tons.

Bell Telephone Co. building, Grand Rapids, Mich., 200 tons.

Koppers Co., Pittsburgh, coke ovens for South Chicago, 187 tons.

Rolled Steel Wheels.—Local bookings in steel wheels during the week were 50 per cent heavier than during the previous week.

Rails and Track Supplies.—The Denver & Rio Grande Western has ordered 10,000 tons of rails from the Colorado Fuel & Iron Co. Otherwise the market has been quiet with prices largely untested. In view of severe competition from outside producers, it is doubtful whether the track supply prices quoted below can be obtained except in the immediate Chicago district. Track spikes have been quoted by mills east of here at as low as 2.90c., f.o.b. Buffalo and f.o.b. Pittsburgh, while on bolts 3.80c., Cleveland, has been done. Light rails are quiet with prices ranging from 2.10c. to 2.25c., mill.

Standard Bessemer and open-hearth rails, $43; light rails, rolled from billets, 2.10 to 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.10c. mill; track bolts with square nuts, 4.10c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.75c. base, and track bolts, 4.75c. base.

Bolts and Nuts.—The market is dull with prices soft. In fact, a schedule of discounts based on 60 and 10 and 5 off for large machine bolts appears to represent the very best that sellers are getting. A discount of 60 and 10 and 10 off for large machine bolts is increasingly common. On small rivets 70 off, Chicago, is representative, while large rivets range from $2.90 to $3, Chicago. Quotations as low as 80 and 10 and 5 off have been named on stove bolts in packages.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.95c.; machine bolts up to ⅞ x 4 in., 55 and 5 per cent off; larger sizes, 55 and 5 off; carriage bolts up to ⅞ x 6 in., 50 and 5 off; larger sizes, 50 and 5 off; hot pressed nuts, squares and hexagons, tapped, $3.50 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

Old Material.—Consumer buying is at a low ebb and prices are weaker, although they have not declined abnormally as a week ago. Users are buying from hand to mouth, but are pressing for quick shipment against such orders as they are placing. For the first time in months, cast borings are lower than short shoveling turnings because a large user of both grades has cut off shipments on the former. Scrap offerings are heavy as indicated by current railroad lists. The Pennsylvania has advertised 47,000 tons; the North Western, 7000 tons; the Burlington, 6600 tons. Both the Erie and the New York Central have issued blank lists and in addition the latter road offers 1000 tons of cast iron car wheels.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$17.00 to	$17.50
Cast iron car wheels	16.00 to	16.50
Relaying rails, 56 and 60 lb.	26.00 to	27.00
Relaying rails, 65 lb. and heavier	27.00 to	32.00
Forged steel car wheels	16.50 to	17.00
Railroad tires, charging box size	16.50 to	17.00
Railroad leaf springs, cut apart	17.00 to	17.50
Rails for rolling	15.00 to	15.50
Steel rails, less than 3 ft.	17.00 to	17.50
Heavy melting steel	13.50 to	14.00
Frogs, switches and guards cut apart	14.00 to	14.50
Shoveling steel	13.25 to	13.75
Drop forge flashings	10.50 to	11.00
Hydraulic compressed sheets	12.00 to	12.50
Axle turnings	12.30 to	13.00
Steel angle bars	15.50 to	16.00
Steel knuckles and couplers	16.50 to	17.00
Coil springs	18.00 to	18.50
Low phos. punchings	15.00 to	15.50
Machine shop turnings	7.00 to	7.50
Cast borings	10.00 to	10.50
Short shoveling turnings	10.50 to	11.00
Railroad malleable	18.50 to	19.00
Agricultural malleable	17.50 to	18.00
	Per Net Ton	
Iron angle and splice bars	16.00 to	16.50
Iron arch bars and transoms	17.00 to	17.50
Iron car axles	24.50 to	25.00
Steel car axles	16.00 to	16.50
No. 1 busheling	10.00 to	10.50
No. 2 busheling	7.50 to	8.00
Cut forge	12.00 to	12.50
Pipes and flues	7.50 to	8.00
No. 1 railroad wrought	12.50 to	12.75
No. 2 railroad wrought	12.00 to	12.50
No. 1 machinery cast	18.00 to	18.50
No. 1 railroad cast	17.50 to	18.00
No. 1 agricultural cast	17.50 to	18.00
Locomotive tires, smooth	14.75 to	15.25
Stove plate	15.00 to	15.50
Grate bars	14.00 to	14.50
Brake shoes	14.50 to	15.00

Bethlehem Steel Co. has sold the limestone quarry on the Lower Mountain Ridge road and the Dickerson hill road in the town of Lewiston, northwest of Pekin, N. Y., to Frederick W. Bond of the town of McAlfee, N. J. The consideration is said to have been $15,000. The property, which consists of 606 acres, was formerly owned by the Lackawanna Steel Co., but was abandoned several months ago. The Lackawanna furnaces for many years obtained their limestone from this quarry.

New York

Structural Steel Only Active Finished Material —Contracting for Coke Heavy

NEW YORK, April 29.—Last week sales of pig iron amounted to about 5000 tons, but transactions the first two days of this week have been extremely light. The Worthington Pump Corporation has purchased only a small part of its inquiry for 1750 tons. The Singer Mfg. Co. has purchased about 1000 tons, and a railroad purchase amounts to about the same tonnage. Prices continue weak, ranging from $20.50 to $21, Buffalo, and $21.50 to $22 eastern Pennsylvania furnace.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$24.77 to $25.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	24.27 to 24.77
East. Pa. No. 2, sil. 1.75 to 2.25	23.77 to 24.27
Buffalo, sil. 1.75 to 2.25	25.41 to 25.91
No. 2X Virginia, sil. 2.25 to 2.75	31.44
No. 2 Virginia, sil. 1.75 to 2.25	30.44

Ferroalloys.—With the decline in steel output there has been a corresponding decline in orders for ferromanganese which at no time have been heavy this year. Orders for carload and small lots are fewer, but when they do appear they are for early shipment. Prices are unchanged. The foregoing conditions also prevail in the spiegeleisen market and prices are also unchanged. There have been no developments in the ferrosilicon or ferrochromium markets.

Cast-Iron Pipe.—Demand is considerably lighter than during the first quarter of the year, the major part of present purchasing being from private rather than municipal buyers. Municipally owned water and gas companies through New England are still quiet. Prices are unchanged despite the weak condition of the pig iron market, which weakness, it is felt, may eventually have a depressing effect on the pipe market. The Department of Water Supply, Gas and Electricity, New York, will open bids April 30 on about 2000 tons of 48-in. water pipe, award to be made to a contractor. The Board of Public Utilities, Jamestown, N. Y., is accepting bids until May 8 for furnishing 20,000 ft. of 6-in. and 2000 ft. of 4-in. water pipe, about 350 tons. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $61.60 to $63.60; 5-in., $66.60 to $68.60; 3-in., $76.60 to $78.60, with $5 additional for Class A and gas pipe. Makers of soil pipe are still booked ahead for the next 60 days or more, but a large part of the tonnage now being delivered is said to have been taken at lower than the current market. Jobbers impressed by the weak pig iron market are demanding protection against a decline on the small business now being placed. We quote discounts of both Southern and Northern makers, f.o.b. New York, as follows: 6-in., 29½ to 30¾ per cent. off list; heavy, 39½ to 40¾ per cent. off list.

Warehouse Business.—While the volume of orders is still fairly large, purchases are, as a rule, of small lots. Despite the quietness and light business, prices continue fairly firm, with only a slight tendency to shade prices on some products. In some quarters it is believed that the gradual curtailment of mill operations will result in slightly more business for warehouses, which recently have felt that they were losing business to the mills because of the prompt deliveries and careful attention given to small lots that normally are filled out of stock. High carbon tool steels continue fairly firm but high speed steel, although quoted by the majority of makers at 70c. per lb., is reported to be weak and buyers claim to have purchased standard brands at concessions of 5c. and more per lb. Business in wrought iron and steel pipe is extremely light considering the usual activity at this season. We quote prices on page 1342.

Finished Iron and Steel.—Considering the dullness prevailing in most branches of the steel trade, there is an unusual amount of structural steel work, this applying both to work let and inquiries. The largest letting of the week was 8000 tons for lift spans for the Central Railroad of New Jersey bridge across Newark Bay. The Bethlehem Steel Co. will roll and fabricate this steel. Except for structural work, orders for steel are coming to local steel company offices only in driblets, a large portion of the orders being for a carload or less. Steel companies have been making an extra effort during the last few days of April to get in specifications on contracts expiring May 1, but consumers and jobbers have in many instances declined to specify their contracts in full. This is due to two causes, first the falling off in business, which has reduced anticipated requirements, and second, the fact that contract prices are in most instances higher than are quoted for current orders. Thus the troubles which have always arisen in the past on a declining market are here again, notwithstanding the determination of many steel companies, as expressed after the wave of cancellations in 1921, that steel contracts should be made more binding upon the buyer. The situation today is that the backlogs which some steel companies counted upon to carry them along for a month or so beyond this date are frozen tonnage because of the lack of full specifications. In bars, shapes, plates and sheets the outlook is not promising from the mill viewpoint, and operations of mills rolling these products are declining. Pipe, which for months has occupied the strongest position of all steel products, is feeling the effects of conditions also, but to a less degree than bars, for example. Pipe discounts are holding well, but jobbers and other buyers have attempted to obtain concessions even on contracts. Prices quoted on plates range from 2.15c. to 2.20c., on bars from 2.25c. to 2.30c., on shapes from 2.25c. to 2.30c., on black sheets, 3.65c. and even less to 3.85c., on galvanized sheets from 4.80c. to 5c. and on blue annealed sheets from 2.85c. to 3c., Pittsburgh. However, the price situation is very irregular and much depends on the desirability of the order and how badly a particular mill may need tonnage. Very little tonnage is being offered that, in the opinion of steel company sales departments, entitles it to special concessions.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.59c. to 2.64c.; plates, 2.54c. to 2.59c.; structural shapes, 2.59c. to 2.64c.; bar iron, 2.54c.

Old Material.—The past week was probably the least active in some time. Only light tonnages of old material are reported moving, with heavy melting steel bringing $14.50 and $15 per ton delivered, depending upon shipment. Borings and turnings are being purchased at $12 to $12.50 per ton, delivered eastern Pennsylvania, and machine shop turnings are worth about $13 per ton delivered. Specification pipe is still being purchased for delivery to a Lebanon, Pa., consumer at $10.25 per ton, New York, and stove plate is unchanged at $11 to $11.50, New York. There seems to be a slightly greater inclination on the part of dealers to increase stocks in the belief that the market is nearing bottom. Among railroad offerings, the New York Central is receiving bids on 1000 car wheels and May 5 opens bids on 10,000 tons of relaying rails.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$11.00 to $11.50
Steel rails, short lengths, or equivalent	11.25 to 11.75
Rails for rolling	16.00 to 16.50
Relaying rails, nominal	25.00 to 26.00
Steel car axles	17.00 to 18.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	14.00 to 14.50
Forge fire	8.50 to 9.00
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	9.50 to 10.00
Machine-shop turnings	9.00 to 9.50
Mixed borings and turnings	9.50 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.25
Stove plate	11.00 to 11.50
Locomotive grate bars	12.00 to 12.50
Malleable cast (railroad)	No market
Cast iron car wheels	15.50 to 16.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$17.00 to $17.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.00 to 16.50
No. 1 heavy cast, not cupola size	12.00 to 12.50
No. 2 cast (radiators, cast boilers, etc.)	14.00 to 14.50

Coke.—A slight increase in demand is reported, largely for second half delivery. Contracts are being renewed and one seller in this district estimates that there has been a total of about 70,000 tons of by-product coke contracted for in the past week or ten days by users in New York and the New England States. Prices continue unchanged at $5 to $5.25 per ton for standard foundry and about $4 per ton for standard furnace coke. By-product is quoted at $10.41, Newark and Jersey City, N. J.

Boston

Buffalo and Pennsylvania Pig Iron Prices Continue Unsettled

BOSTON, April 29.—Keen rivalry between Buffalo and eastern Pennsylvania furnaces for business in this territory keeps prices unsettled. An eastern Pennsylvania furnace is credited with selling 800 tons No. 2X second quarter iron to a Vermont foundry at $21.50 furnace or $25.15 delivered. Other eastern Pennsylvania interests are now offering No. 2X second and third quarter iron at $21 furnace, while Buffalo No. 2X has been offered at less than $20.25 furnace. Buffalo No. 2X has, however, sold in a small way for second quarter delivery at $21.50 and No. 1X at $22 furnace. Virginia and Alabama furnaces are maintaining prices, consequently are not a factor in this market. Indian iron has sold in a small way at $24 on dock duty paid for silicon equivalent to our No. 2X, and Continental at $22.50 and $22.75 on dock duty paid. Inquiry, while not heavy, is more active than early this month. A Springfield, Mass., foundry wants 500 tons No. 1X, third quarter iron, and a Providence, R. I., plant 500 tons eastern Pennsylvania No. 2X, May and June delivery. Inquiry otherwise is for smaller lots, mostly second quarter delivery. A local foundry has purchased 270 tons of malleable second quarter iron, but details are lacking. A 200-ton lot of Scotch iron, the first in considerably more than a year, has been received at this port.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$25.15 to $26.15
East. Penn., sil. 1.75 to 2.25	25.15 to 25.65
Buffalo, sil. 2.25 to 2.75	26.41 to 26.91
Buffalo, sil. 1.75 to 2.25	25.91 to 26.41
Virginia, sil. 2.25 to 2.75	32.42 to 33.42
Virginia, sil. 1.75 to 2.25	31.92 to 32.92
Alabama, sil. 2.25 to 2.75	33.10
Alabama, sil. 1.75 to 2.25	32.60

Shapes and Plates.—The market for shapes appears to have settled down to a basis of 2.25c. Pittsburgh, bookings by the mills being sufficiently heavy to insure greater stability in prices. Fabricators report deliveries as somewhat backward. The plate situation, on the other hand, is still unsettled at 2.15c. to 2.20c. Pittsburgh base. New projects calling for structural steel aggregate approximately 2000 tons, a distinct falling off as compared with a month ago. Of this amount, three projects call for approximately 1500 tons, the remainder being distributed among smaller jobs.

Warehouse Business.—More seasonable weather conditions have made for a slightly freer movement of iron and steel out of stock. Small rivets have been reduced 10 per cent and sheet brass and copper ½c. a lb.

Soft steel bars, $3.51½ per 100 lb. base; flats, $4.40; plain and deformed concrete bars, $3.76½; small angles, channels and tees, $3.51½; structural steel, large angles and beams, $3.61½; tire steel, $4.80 to $5.15; open-hearth spring steel, $5 to $8; crucible spring steel, $12; steel bands, $4.31½ to $5.20; hoops steel, $5.80 to $6.30; cold rolled steel, $4.35 to $4.85; toe calk steel, $6.15; heavy plates, $3.61½; light plates, $3.86½; diamond pattern plates, stock sizes, $5.90; blue annealed sheets, $4.51½; refined iron bars, $3.51½; best refined iron bars, $4.75; Wayne, $5.50; Norway rounds, $6.60; Norway squares and flats, $7.10.

Coke.—The New England Coal & Coke Co. and the Providence Gas Co. have opened their books for last half by-product foundry coke business. As heretofore, contracts are on a sliding scale basis. Foundries are signing up freely. Both concerns continue to quote fuel at $12 a ton delivered within New England. Current takings by foundries are holding their own and indications are the movement of coke from ovens in April will exceed that for March by a comfortable margin.

Old Material.—A few hundred tons of heavy melting steel were purchased the past week at $10 and $10.50 on cars shipping point on new orders for shipment to eastern Pennsylvania, that price representing a further drop of 50c. a ton in the market. In addition, modified tonnages of wrought pipe and machine shop turnings have been taken at prices quoted a week ago, and there are scattering sales of chemical borings for New Jersey delivery. Otherwise, however, business remains fully as inactive as heretofore. So far as can be ascertained, no market exists for axles, shafting, rails for rolling, wrought and stove plate, consequently prices are purely nominal. No. 1 machinery cast prices have eased another 50c. a ton in sympathy with the pig iron market, yet foundries display little or no interest in such material.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$21.00 to $21.50
No. 2 machinery cast	18.00 to 18.50
Stove plates	15.00 to 15.50
Railroad malleable	18.00 to 19.00

The following prices are offered per gross ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.00 to $10.50
No. 1 railroad wrought	11.50 to 12.00
No. 1 yard wrought	10.50 to 11.00
Wrought pipe (1-in. in diam., over 2 ft. long)	9.00 to 9.50
Machine shop turnings	8.50 to 9.00
Cast iron borings, chemical	10.00 to 10.50
Cast iron borings, rolling mill	8.50 to 9.00
Blast furnace borings and turnings	8.50 to 9.00
Forged scrap and bundled skeleton	9.00 to 9.50
Shafting	15.00 to 16.00
Street car axles	15.00 to 16.00
Rails for rolling	12.00 to 12.25

Buffalo

Pig Iron Dull and Prices Untested—Finished Material Demand Light

BUFFALO, April 29.—A dullness has set in and so little business is being done in pig iron that it is difficult to estimate what is a correct price. The inquiry ranges with various makers anywhere from 1300 tons to 2000 tons. One of the inquiries listed is for 1000 tons of foundry from New England, but it is possible that this is an overlapping of the Fairbanks inquiry of 1000 tons listed last week. Of the 1000 tons sought by this concern, about 800 tons of 2.25 to 2.75 silicon foundry went to an eastern Pennsylvania maker for third quarter delivery. The rest of the inquiry was iron for second quarter delivery and is believed to be still unplaced. Of the American Hardware Corporation inquiry for 1000 tons listed two weeks ago, a Buffalo furnace last week took 500 tons. About 400 tons of high silicon foundry of the Worthington Pump Corporation lot of 1750 tons was placed with a Buffalo furnace. An inquiry this week is for 500 tons of foundry iron from New England. Business placed has been very light and no test has been made on sizable tonnage. On small lots the going price seems to be $21 for 1.75 to 2.25 silicon and 2.25 to 2.75 silicon. Two furnace interests are holding out for $21.50, but are placing very little on this basis. A price of lower than $21 could undoubtedly be had on a sizable lot. Malleable has been sold during the week at $21.

We quote f.o.b., gross ton, Buffalo, as follows:

No. 1 foundry, sil. 2.75 to 3.25	$21.50
No. 2 foundry, sil. 2.25 to 2.75	21.00
No. 2 plain, sil. 1.75 to 2.25	$20.50 to 21.00
Basic	21.00
Malleable	21.00
Lake Superior charcoal	29.28

Finished Iron and Steel.—Business is quiet in all lines, but mills do not believe this condition will last long. The market for bars, shapes and plates runs along about as usual with volume of orders and inquiry small, but rapid deliveries asked. The prices range between 2.30c. and 2.35c. with a possibility that sizable tonnage could be placed at lower figures. Wire business is fair with prices of 2.75c. on wire and 3c. on nails firm. Coated nails have been cut some. Steady specifications are coming in on pipe from jobbers who are taking their

usual quotas. No holdups or cancellations are being made in pipe, but the business placed is not so heavy as last year. Building awards are not so heavy. Local fabricators are inclined to doubt that definite awards have been made in the Liberty Bank job. Reinforcing bar makers will fabricate 200 tons of bars for a four-story warehouse addition, but the contract has not been let yet. A 150-ton order for road bars has been placed with the Kalman Steel Co. Some time during the week reinforcing bars will be placed for school construction. School No. 31 will require 330 tons; School No. 71, 180 tons and School No. 63, sixty tons. Roadwork is responsible for a local wire mill picking up a good deal of mesh tonnage. Some semi-finished is moving. Local forging billet makers are quoting $45 and upwards; re-rolling billets are quoted at not lower than $40 and some rods are being sold at $51 Pittsburgh.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5c.; cold-rolled and round shafting, 4.45c.

Old Material.—The buying is very light this week and the market almost featureless. A good many furnaces have curtailed operations and production of scrap is lighter throughout the district. Dealers are buying a little and one mill continues its policy of picking up low-priced heavy melting steel in small lots. This mill has bought several hundred tons of heavy melting steel at $14 which might be described as "distress" tonnage. This mill has also succeeded in buying some small lots for less. A sale of 400 to 500 tons of heavy flashings at under $13 is noted and bushelling is said to have been purchased at $12.50 to $13. Most of the buying is not because the mill really needs the tonnage, but speculatively. A little No. 1 cast is being purchased at $18 to $18.25, and some malleable around $19.

We quote f.o.b., gross ton, Buffalo, as follows:

Heavy melting steel	$14.50 to $15.50
Low phos., 0.04 and under	20.00 to 21.00
No. 1 railroad wrought	14.50 to 15.00
Car wheels	18.00 to 18.50
Machine shop turnings	11.00 to 11.75
Cast iron borings	12.50 to 13.00
No. 1 busheling	15.00 to 15.50
Stove plate	16.00 to 16.50
Grate bars	16.00 to 16.50
Bundled sheet stampings	10.00 to 11.00
Hydraulic compressed	15.00 to 15.50
Railroad malleable	19.00 to 19.50
No. 1 machinery cast	18.25 to 19.00

Cincinnati

Slight Increase in Activity in Pig Iron—Scrap Again Declines

CINCINNATI, April 29.—There is more activity in pig iron, a nearby melter being in the market for 1500 tons of Northern foundry, and an Indiana melter for 500 tons. Inquiries for one and two carloads are also more numerous. The largest sale reported during the week was to a local company, which took 500 tons of Northern and 300 tons of Southern, the former at a reported price of $22.50 and the latter at $22. These prices are being quoted today and represent the present market in the respective districts, although it may be possible that resale iron could be had for slightly less. There is little activity in basic, Bessemer or silvery irons and prices are unchanged.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$26.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	26.55
Ohio silvery, 8 per cent	35.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	24.77
Basic Northern	23.77
Malleable	24.77

Sheets and Tin Plate.—Practically all the independent manufacturers of automobile body sheets are now quoting 5.10c. on No. 22 gage material. On blue annealed, black and galvanized, 2.85c., 3.70c. and 4.90c. are the generally recognized market quotations, though in the case of galvanized sheets a price of 4.85c. was named to a large manufacturer in the district. Demand for tin plate is light, but can manufacturers in the district report operations continuing at full blast. Little interest is centered in the price for last half, as the opinion is general that no change will be made.

Structural Activity.—With the exception of U. S. Government work for Ohio River improvements and barge work, there is little new inquiry. Awards during the past week were light, though bids are in on a number of projects involving considerable aggregate tonnages. On the regulation gates for the Wilson Dam at Muscle Shoals, involving 58 gates for an aggregate of 2005 tons of steel, the McClintic-Marshall Co. was the low bidder on an f.o.b. basis at $3,300 per gate. This company bid $900 per gate for erection, or a total of $4,200 per gate erected. The Newport News Shipbuilding Co. bid $3,380 per gate, f.o.b., with $715 for erection, or a total of $4,095 erected.

Reinforcing Bars.—Bids have been opened on the waterworks reservoir for the city of Cincinnati, in which 1000 tons of reinforcing bars are involved. The low bidder, Max Penker & Sons, was $100,000 below the estimate, and probably will be awarded the contract. Other projects involving considerable tonnages are scheduled for award this week. There is little change in prices, rail steel bars being quoted at 2.10c., mill, and bars rolled from new billets at 2.30c., mill.

Warehouse Business.—Jobbers report fair activity for the heavy products, and this month will show an increased movement over March. There is little demand for wire products, and this spring's sales have been disappointing. Prices are being maintained.

Coke.—The coke market is slightly more active, but sales are confined to one and two carloads for immediate shipment. Some concerns which had suspended shipments on April contracts will take in part of the tonnage on May orders, and altogether the outlook is considerably improved, By-product foundry coke prices for May have been reduced 50c. to $7.50, Connellsville basis.

Connellsville furnace, $3.75; foundry, $4.75; New River foundry, $10; Wise County furnace, $4; foundry, $5; by-product foundry, $7.50, Connellsville basis.

Old Material.—There is very little activity in scrap in this district, but some sales are reported to Southern melters at prices 50c. below last week. Mills in this district have turned down offers of $14 for heavy melting steel, but have offered $10, gross, delivered, for turnings. The market is off at least 50c., and dealers think it will go lower. The Pennsylvania Railroad is offering 47,000 tons of various grades.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton	
Heavy melting steel	$11.00 to $11.50
Scrap rails for melting	10.50 to 11.00
Short rails	15.50 to 16.00
Relaying rails	27.00 to 27.50
Rails for rolling	12.50 to 13.00
Old car wheels	11.50 to 12.00
No. 1 locomotive tires	12.50 to 13.00
Railroad malleable	13.50 to 14.00
Agricultural malleable	12.50 to 13.00
Loose sheet clippings	7.00 to 7.50
Champion bundled sheets	9.00 to 9.50
Per Net Ton	
Cast iron borings	7.50 to 8.00
Machine shop turnings	6.50 to 7.00
No. 1 machinery cast	16.50 to 17.00
No. 1 railroad cast	13.00 to 13.50
Iron axles	19.50 to 20.00
No. 1 railroad wrought	9.00 to 9.50
Pipes and flues	6.00 to 6.50
No. 1 busheling	7.50 to 8.00
Mixed busheling	5.00 to 5.50
Burnt cast	9.00 to 9.50
Stove plate	9.00 to 9.50
Brake shoes	10.00 to 10.50

Finished Materials.—There is little buying of finished materials. Carload orders continue to be the rule, and prices generally are weak, despite the fact that attempts are being made to stabilize the market. The regular price quoted on plates is 2.25c., but it is intimated that considerably lower could be done on attractive tonnages. On shapes the regular quotation of 2.35c., for carload lots, has been shaded to 2.30c., and it is said that 2.25c. has been done on single carloads. There is a slight improvement over previous weeks in the demand for bars, with 2.30c. being regularly quoted. For cold-rolled bars, the larger mills are maintaining 3c., but it is possible to place orders at 2.85c. Cold-rolled steel orders are tapering off, and some manufacturers are holding up shipments on contracts. Hoops and bands are regularly quoted at 2.90c., but on attrac-

tive orders 2.75c. has been done. Persistent reports are current that wire nails can be had at $2.90, base, mill, but this price has not been regularly quoted as yet, although delivered prices on some orders would figure back to that basis at Pittsburgh. Ironton mills continue to quote $3 per keg, mill, with river freight of 15c. per keg to Cincinnati. Pittsburgh district independents are equalizing freight to this district. There is a limited demand for bolts and nuts, and prices are unstable. Light rails are not in demand. Forgings are moving fairly well, with some manufacturers able to make almost immediate delivery.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.25c.; cold-rolled flats, squares and hexagons, 4.25c.; open-hearth spring steel, 5c. to 6c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, 3.60c.; common wire nails, $3.50 per keg base; cement coated nails, $3 per keg.

Birmingham

Pig Iron Sales Confined to Small Lots—Cast Iron Pipe Is Active

BIRMINGHAM, ALA., April 29.—Though sales of pig iron in the Birmingham district are of the small-lot variety, the total tonnage is showing improvement. Shipments of pig iron on old contracts are still active, the aggregate being in excess of the production and the same number of blast furnaces are in blast as has been noted for several months. So far there are not many orders in hand for third quarter delivery. Quotations are still weak with $22, No. 2 foundry, 1.75 to 2.25 per cent silicon, base, the minimum, and $23 being asked by several interests.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

No. 1 foundry, 2.25 to 2.75 sil.	$22.50 to $23.00
No. 2 foundry, 1.75 to 2.25 sil.	22.00 to 23.00
Basic	22.50 to 23.00
Charcoal, warm blast	32.00 to 33.00

Cast Iron Pipe.—All pipe shops of the Birmingham district have business which warrants practically capacity speed and shipments equal to the production. Many specifications are in sight and bidding going on in various directions which will result in considerable tonnage. The American Cast Iron Pipe Co. in its shop publication reviews success of the winter buying, distributing 42,000 tons during December, January, February and March, and relieving the spring and summer of that much of a rush and making it possible to keep active the plant here. All DeLavaud machines, producing centrifugal made pipe, at plants of the United States Cast Iron Pipe & Foundry Co. and the National Cast Iron Pipe Co., are in full operation. Production by this method will be increased during the year by the addition of more machines. The American Cast Iron Pipe Co.'s orders for the week include 408 tons for Birmingham, Ala.; 475 tons for Kansas City, Mo.; 793 tons for Columbus, Ohio, and 104 tons for Camden, Ill.

We quote class B, 4-in. water, $52 to $53; 6-in. and over, $48 to $49; class A, $5 higher; standard soil pipe, $60; heavy gage, $45; standard fittings, $110.

Coke.—All by-product coke ovens of the district are in operation, the iron making companies having large requirements themselves. Foundry coke, beehive and by-product are quoted at $6 to $6.50; furnace coke, $5 to $5.50.

Scrap.—No new business is being received by dealers in scrap iron and steel. Steady delivery of the various products on old contracts will continue for several weeks. Dealers are bringing in as much scrap as they are delivering. Quotations are showing weakness. Heavy melting steel is exceptionally quiet and is quoted at $13.50. Cast iron pipe makers are still taking cast and some stove plate is moving, but all of this business is on old contracts. Car service continues good with the old material dealers and transportation companies cooperating in all lines in industrial circles.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Cast iron borings, chemical	$15.00 to $16.00
Heavy melting steel	13.50 to 14.00
Railroad wrought	12.00 to 13.00
Steel axles	19.00 to 19.50
Iron axles	20.00 to 21.00
Steel rails	12.00 to 13.00
No. 1 cast	20.00 to 20.50
Tram car wheels	17.00 to 18.00
Car wheels	16.00 to 17.00
Stove plate	15.50 to 16.50
Machine shop turnings	7.00 to 8.00
Cast iron borings	8.00 to 9.00
Rails for rolling	16.50 to 17.00

St. Louis

Pig Iron Sales Confined to Car Loads—Coke and Scrap Dull

ST. LOUIS, April 29.—A few carloads constitutes the business done in pig iron during the last week. No inquiries of size are pending, and it seems likely that melters will continue a hand-to-mouth buying policy for the remainder of this quarter. A falling off in business is reported by job foundries, and the stove plants, too, also are showing a lighter melt. March sales of stove manufacturers, seven reporting to the Federal Reserve Bank of St. Louis, were 21.3 per cent under the same month in 1923, and 3.7 per cent larger than the February total this year; job foundries, five reporting, decreased 8.6 per cent under March, 1923, but gained 2.6 per cent over February, this year; farm implement makers, 6 reporting, decreased 16.8 per cent under March last year and 2.5 under the February totals this year. Prices of pig iron are unchanged, but quotations mean little, as it is difficult to say what price would prevail on any considerable tonnage.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Florence and Sheffield (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge fram Granite City:

Northern fdy., sil. 1.75 to 2.25	$26.16
Northern malleable, sil. 1.75 to 2.25	26.16
Basic	26.16
Southern fdy., sil. 1.75 to 2.25 (rail)	27.17
Southern foundry, sil. 1.75 to 2.25 (rail and water)	26.28
Granite City iron, sil. 1.75 to 2.25	$26.31 to 25.81

Finished Iron and Steel.—A leading warehouse reports that more orders are being placed now than a year ago at this time. However, the orders are smaller and the volume of the whole is not so great as last year. Warehouses seem to be doing fairly well, thus profiting by the tendency of manufacturers of steel products to buy in less than carload lots. Warehouses have not met the price reduction made by Chicago mills, and probably will not do so, contending that the margin of profit has been entirely too small. No railroad inquiries are before the market. Fabricators of structural steel report very little new business coming in. The Laclede Steel Co. got the order for 550 tons of reinforcing bars for the Jewish Hospital and 250 tons for a building for the Concordia Publishing Co., St. Louis.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold-rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 4.70c.; structural rivets, 4.15c.; boiler rivets, 4.35c.; tank rivets, $\frac{7}{8}$-in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, squares or hexagons blank, $2.50, and taped, $2.50 off list.

Coke.—The coke market is easy. Water gas companies which place contracts for their annual requirements at this time of year have not yet closed. There is very little demand for foundry grades, and domestic coke is almost a dead issue.

Old Material.—There is almost no buying of old material by consumers in the St. Louis district, even cast

iron foundries, which had been doing some buying, being out of the market. Dealers are interested only in spot cars to cover contracts, most of which will expire this week. Prices of some items continue to decline. New railroad lists include the following: New Orleans & Great Northern, 150 tons; Chicago, Cleveland, Cincinnati and St. Louis, blind list; St. Louis Southwestern Railway, 2000 tons; San Antonio & Aransas Pass, 600 tons, and New York Central lines, 5000 tons of relaying rails.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$13.00 to $13.50
Rails for rolling	15.00 to 15.50
Steel rails less than 3 ft.	18.00 to 18.50
Relaying rails, 60 lb. and under	25.00 to 26.00
Relaying rails, 70 lb. and over	32.50 to 33.50
Cast iron car wheels	16.50 to 17.00
Heavy melting steel	14.00 to 14.50
Heavy shoveling steel	14.00 to 14.50
Frogs, switches and guards cut apart	14.00 to 14.50
Railroad springs	17.00 to 17.50
Heavy axles and tire turnings	12.00 to 12.50
No. 1 locomotive tires	15.75 to 16.25
Per Net Ton	
Steel angle bars	15.00 to 15.50
Steel car axles	16.00 to 16.50
Iron car axles	22.00 to 22.50
Wrought iron bars and transoms	18.00 to 18.50
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	12.50 to 13.00
Cast iron borings	10.00 to 10.50
No. 1 busheling	12.50 to 13.00
No. 1 railroad cast	18.00 to 18.50
No. 1 machinery cast	18.00 to 18.50
Railroad malleable	16.00 to 16.50
Machine shop turnings	7.00 to 7.50
Champion bundled sheets	8.00 to 8.50

Cleveland

Buyers Look for Lower Prices, Which Still Show Irregularity

CLEVELAND, April 29.—The volume of business continues very light and sales are limited to small lots for early needs. Buyers generally are looking for further price reduction and continue to follow a very cautious policy in making commitments. Some construction work is being held up presumably until the market appears to have touched bottom. Consumers continue to reduce stocks and there has been some slowing down in operation in metal working plants outside of the automobile field in which the curtailment is the most pronounced. The market lacks strength and prices on steel bars, plates and structural material average a little lower than a week ago. On the three items most mills are quoting 2.30c., at which some small lot business is being taken. However, on steel bars and plates 2.25c. is now being freely quoted by one or more smaller mills and plates have gone as low as 2.20c. With a desirable inquiry to test the market, it is evident that several large mills will go to 2.25c., and this might be shaded on structural material and steel bars as well as on plates. Hot-rolled strip steel is irregular, with 2.60c., quoted by some mills, but this has been shaded for wide material. Bands appear to be holding at 2.75c. and hoops at 2.90c. Prices on cold-rolled strip steel range from 4.50c. to 4.65c. In alloy steels 3½ per cent nickel steel is being shaded to 4.50c. New inquiries in the building field are more active. The Pennsylvania Railroad is expected to place shortly several thousand tons of structural material for grade crossing elimination work in Cleveland. The Standard Oil Co. has postponed the placing of soaking drums requiring 2500 tons of 2-in. plates for which an inquiry was recently sent out. An inquiry has come out for a lake boat requiring 3000 tons of steel, but two or three other lake vessel building projects have been abandoned.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.55c. to 4.65c.; No. 28 galvanized sheets, 5.65c.; No. 10 blue annealed sheets, 3.65c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, $3.50 per 100 lb.; No. 9 galvanized wire, $3.95 per 100 lb.; common wire nails, $3.60 base per 100 lb.

Pig Iron.—Several inquiries for foundry iron for the third quarter came out during the week. One producer received three inquiries for that delivery aggregating 3000 tons, on which it quoted its present second quarter price. Another inquiry was for the last half. No sales have been made as yet for delivery beyond June and producers are rather doubtful whether the inquiries will bring out any immediate orders, but they show that consumers are watching the market and might buy some iron as soon as they are convinced that prices have touched bottom. Sales continue very light, being limited for the most part to one or two car lots. The market is weak, without enough business being placed to test prices. While small lot sales were made at $22 during the week by Valley producers, $21.50 now appears to be the more common Valley price and it is regarded as probable that $21 would be quoted on a desirable inquiry. One lake furnace has reduced its price 50c. a ton to $22. In Cleveland quotations for local delivery are holding at the $23 base and for out-of-town shipment the price is nominally $22, but local furnaces will meet whatever price conditions develop in the Valley district. With suspensions, mostly from foundries in the automobile field and lack of new orders, furnaces are beginning to pile iron and unless shipping orders improve, some will accumulate stocks of considerable size within the next few weeks.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$21.50
N'th'n No. 2 fdy., sil. 1.75 to 2.25	23.50
Southern fdy., sil. 1.75 to 2.25	$28.00 to 28.50
Malleable	23.50
Ohio silvery, 8 per cent	25.52
Stand. low phos., Valley furn.	28.50

Iron Ore.—Lake vessel rates for iron ore have been established at 70c. a ton from the head of Lake Superior to Lake Erie ports, a reduction of 10c. from last year. Other vessel rates for this season are 63c. from Marquette and 52½c. from Escanaba to Lake Erie ports and 42c. from Escanaba to Lake Michigan ports. There has been some contracting at the new rates. As the shipper pays the lake transportation, the ore sellers will get the benefit of the 10c. reduction as a partial offset against the recent 80c. per ton reduction in ore prices. However, there is an exception to this in the contracts recently made by the Ford Motor Co. which was able to secure contracts with clauses allowing the company the benefit of any reduction made during the season in freight rates. Ore sales continue very light and unless conditions change materially in the near future, a number of mines will probably shut down because of a lack of market for their output. Oglebay, Norton and Co. will suspend operations in their Bristol mine on the Menominee Range May 1. The first ore cargo shipped this season reached Cleveland April 26. The movement is expected to be very light during the next few weeks.

Sheets.—The market is irregular and demand is light. Further concessions on galvanized sheets to 4.75c. are reported. On black sheets 3.60c. has become a common quotation, but blue annealed sheets appear to be holding fairly firm at 2.85c. Mills in this district have made the cut to 5.10c. on automobile body sheets, which have been weak, but the reduction has not yet stimulated buying.

Reinforcing Bars.—The Walsh Construction Co. has taken the general contract for the Hilliard Road County bridge, requiring 800 tons of billet steel bars. Prices are unchanged at 2.25c. to 2.30c. for billet steel bars and 2c. to 2.10c. for rail steel bars.

Warehouse Business.—A leading jobber has made a $2 a ton reduction on its regular prices on sheets. Other warehouse prices are unchanged. Some jobbers report an improved demand for steel bars owing to the policy of many consumers to buy small lots from the warehouse instead of placing mill orders.

Semi-Finished Steel.—Sheet bar specifications are light owing to curtailment in sheet mill operations and there is little new demand. The price is unchanged at $41. Slabs are untested, with the market nominally at $40, although there are further reports of that price being quoted delivered Cleveland. However, consumers declare that with the $6 a ton drop in plate prices there must be a further cut in slab prices.

Bolts, Nuts and Rivets.—The recent weakness in the bolt and nut market has resulted in a 10 per cent reduction from recent regular discounts for current orders. Consumers having contracts are also being given the lower prices. The new prices represent about the extreme discounts that have appeared in the past week or two. Hot-pressed and cold-pressed nuts are also lower and a 10 per cent reduction has been made on semi-finished hexagon nuts. Manufacturers declare that the new prices are considerably below the cost of production. Rivet prices are still irregular, although the leading local producer is holding to 2.75c. on large rivets and has advanced its price to 70 per cent off list for small rivets.

Coke.—One Connellsville district producer has reduced prices on foundry coke 75c. a ton to $5.75, passing along to consumers a wage reduction. The general price situaion is unchanged, quotations on standard Connellsville coke ranging from $4.75 to $6.50. The market is quiet, with sales limited mostly to car lots.

Old Material.—The market is almost lifeless and prices have further declined on several grades. The only buying reported by mills is odd lots which dealers have been forced to move and on which they have made attractive prices. One Valley district mill has suspended shipments. Prices have further declined on several grades. Heavy melting steel and railroad malleable were marked down 75c. a ton during the week, but other reductions were from 25c. to 50c. a ton.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$13.00 to $13.25
Rails for rolling	14.75 to 15.50
Rails under 3 ft	19.25 to 19.50
Low phosphorus melting	16.25 to 16.50
Cast iron borings	10.50 to 10.75
Machine shop turnings	10.50 to 10.75
Mixed borings and short turnings	10.50 to 10.75
Compressed sheet steel	11.25 to 11.50
Railroad wrought	10.25 to 10.50
Railroad malleable	16.25 to 16.50
Light bundled sheet stampings	9.75 to 10.00
Steel axle turnings	11.00 to 11.25
No. 1 cast	19.00 to 19.50
No. 1 busheling	9.50 to 9.75
Drop forge flashings	8.00 to 8.25
Railroad grate bars	13.25 to 13.50
Stove plate	13.25 to 13.50
Pipes and flues	8.25 to 8.50

Detroit Scrap Market

DETROIT, April 29.—The situation on old material is similar to last November, with prices at new low levels for the year, and dealers beginning to stock their yards. Blast furnace materials registered further declines with bidders on tonnages consisting of dealers exclusively. Melters are expecting increases in their melting schedules prior to June 1.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting steel	$11.75 to $12.50
Shoveling steel	11.75 to 12.50
Borings	8.75 to 9.75
Short turnings	8.75 to 9.75
Long turnings	8.00 to 8.50
No. 1 machinery cast	15.00 to 16.00
Automobile cast	21.00 to 23.00
Hydraulic compressed	9.50 to 10.00
Stove plate	13.50 to 14.50
No. 1 busheling	8.75 to 9.75
Sheet clippings	7.50 to 8.00
Flashings	8.75 to 9.25

Youngstown Scrap Market

YOUNGSTOWN, April 29.—The scrap metal market in this district is somewhat difficult to define owing to the quietness prevailing. The leading melters have wholly withdrawn from the market and show no indications as yet of buying in any substantial way. Until steel buying revives in a larger way, they indicate that scrap purchases will be held to an absolute minimum.

Furthermore, the leading Valley steel producers are turning out in their own finishing mills about all the scrap required for their open-hearth furnaces.

Heavy melting has declined to a $15 base, and purchasing agents say they can secure all the material they require at this figure.

Philadelphia

Steel Business Continues to Decline and Prices Are Weaker

PHILADELPHIA, April 29.—Each week brings new evidence of reduced volume of steel business. The Bethlehem Steel Co.'s operations have declined about 20 per cent in the last few weeks, according to an announcement by President Eugene G. Grace. Eastern plate mills, whose operations in first quarter did not exceed 50 per cent on the average, are slightly below this figure, probably about 40 per cent, and other rolling mills are similarly affected. Further weakness in prices, particularly on plates, has developed. The pig iron market has shown a slight gain in the number of inquiries, but these have not yet resulted in any material change in the volume of tonnage being placed, this being unusually small.

Pig Iron.—Except for a slight increase in the number of inquiries, all of which are for small lots, it cannot be said that there is any change from the marked lassitude which has characterized the pig iron market during the last few weeks. Prices are weak, and it is difficult to ascertain what prices might be quoted if any very attractive tonnage were to develop. On current small orders, quotations on foundry iron range from $21.50 to $22.50, furnace, for No. 2 plain, with 50c. added for No. 2 X.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$22.26 to $23.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.76 to 23.63
East. Pa. No. 1X	23.26 to 2413
Virginia No 2 plain, 1.75 to 2.25 sil.	30.17 to 31.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.67 to 31.67
Basic delivery eastern Pa.	21.50 to 22.50
Gray forge	22.00 to 22.50
Malleable	23.00 to 23.50
Standard low phos. (f.o.b. furnace)	25.00 to 26.00
Copper bearing low phos. (f.o.b. furnace)	25.00 to 26.00

Ferroalloys.—In the absence of business, the price on ferromanganese remains unchanged at $107.50, furnace or seaboard, for both domestic and foreign alloy. Spiegeleisen is quoted at $36, seaboard or furnace.

Billets.—On current sales of carload lots, open-hearth rerolling billets take a price of $38, Pittsburgh. Forging billets have been sold in small lots at $43, Pittsburgh.

Plates.—On very attractive tonnages of plates, 2.10c., Pittsburgh, has been quoted, but the market range on the smaller lots, which make up the bulk of current buying, is 2.15c. to 2.20c., Pittsburgh. While there has been some falling off in plate business, this product probably has not suffered so much as some others because it did not at any time this year reach the volume that was attained by shapes or bars in the Eastern district. The American Locomotive Co., New York, will buy 3000 tons or more for the 100 locomotives to be built for the Chesapeake & Ohio Railroad.

Structural Material.—Local fabricating shops are still very busy on work which has been contracted for during the past few months, but demands upon the mills for shapes is not so brisk as it was a few weeks ago. However, a fair amount of structural work is being figured on. Prices on shapes are weak at 2.25c. to 2.30c., Pittsburgh. In a few instances 2.25c. has been shaded.

Bars.—The demand for steel bars is exceedingly dull. Neither jobbers nor consumers are buying except in the smallest possible way. Prices quoted are 2.25c., Pittsburgh, for the larger and otherwise more attractive specifications and 2.30c. for small lots. Bar iron is unchanged at 2.20c., Pittsburgh.

Sheets.—Orders for blue annealed sheets have shown a slight improvement, but are less in volume than current shipments. A leading Eastern maker of blue annealed steel is operating at 70 per cent. Prices on all

grades of sheets are weak, blue annealed ranging from 2.85c. to 2.90c., black from 3.65c. to 3.75c., and galvanized from 4.85c. to 4.90c., Pittsburgh basis.

Imports.—Nearly 1300 tons of steel from France and Belgium came in at this port last week. From France was received 523 tons of blooms, and from Belgium 460 tons of beams and 288 tons of channels and angles. The only iron ore received was 7331 tons from Sweden.

Warehouse Business.—A fair volume of buying out of stock is being done, notwithstanding the reduced volume of purchasing from mills. Prices are unchanged except that blue annealed sheets have been slightly reduced. Other prices are somewhat irregular, some jobbers giving concessions from the prices named below, which are for local delivery only:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.50c.; round edge steel planished, 4.30c.; tank steel plates, ¼ in. and heavier, 3.75c.; tank steel plates, ⅛ in., 3.82c.; blue annealed steel sheets, No. 10 gage 3.90c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.75c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ⅛-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅛-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Old Material.—Prices of all grades of old material have gone so low that both consumers and brokers are finding it difficult to buy. With high freight rates and high labor costs, yard dealers do not consider it profitable to ship scrap at current quotations, and whenever it is possible to do so it is being stored in their yards for later sale. Heavy melting steel has remained at the same level for three weeks, namely $15 to $15.50, and brokers believe it has reached bottom. There are declines this week in some other grades.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.00 to $15.50
Scrap rails	15.00 to 15.50
Steel rails for rolling	17.50 to 18.00
No. 1 low phos., heavy 0.04 and under	19.50 to 20.00
Couplers and knuckles	17.50 to 18.50
Cast-iron car wheels	17.00 to 17.50
Rolled steel wheels	17.50 to 18.50
No. 1 railroad wrought	17.00 to 18.00
No. 1 yard wrought	16.00 to 17.00
No. 1 forge fire	12.50 to 13.00
Bundled sheets (for steel works)	12.00 to 12.50
Mixed borings and turnings (for blast furnace use)	12.00 to 12.50
Machine shop turnings (for steel works use)	12.50 to 13.00
Machine shop turnings (for rolling mill use)	13.00 to 13.50
Heavy axle turnings (or equivalent)	14.00 to 14.50
Cast borings (for steel works and rolling mills)	13.50 to 14.00
Cast borings (for chemical plants)	15.50 to 16.50
No. 1 cast	17.00 to 17.50
Heavy breakable cast (for steel plants)	14.50 to 15.00
Railroad grate bars	14.50 to 15.00
Stove plate (for steel plant use)	14.50 to 15.00
Wrought iron and soft steel pipes and tubes (new specifications)	14.00 to 14.50
Shafting	19.00 to 20.00
Steel axles	19.00 to 20.00

More Space for Steel Treaters' Exposition in Boston

The demand for exposition space for the International Steel Exposition to be held jointly with the convention of the American Society for Steel Treating, Commonwealth Pier, Boston, Sept. 22 to 26, reached a point where all of the space on the original floor plans has become exhausted. It has been necessary to open up another section of the pier containing 50 additional spaces. Practically 20 per cent of this new available space has already been reserved, and it is an assured fact that the exposition this year will be the largest ever held by the society.

The new section will be devoted exclusively to the machine tool manufacturers and will contain only operating exhibits. The total amount of floor space available for exposition purposes is 150,000 sq. ft., as compared with 79,000 sq. ft. used in Pittsburgh last year.

Wages of Keystone Mine and Coke Oven Workmen Reduced

PITTSBURGH, April 29.—In conjunction with a revision downward of its coke prices of 75c. a ton, the Keystone Coal & Coke Co., Greensburg, Pa., has made a reduction averaging about 20 per cent in wages of mine and coke oven workmen. Day workmen formerly receiving $7.50 a day are reduced to $6 a day, with a corresponding cut in the scales of other classes of help. No trouble has resulted from the wage revision, as the men apparently are satisfied with the lower wages and fuller employment.

None of the other large producing interests in the Connellsville district yet has taken any action in the direction of lowering wages and there is some doubt that they will do anything in the immediate future, since there is doubt that lower prices, through lower wages, would help business to any considerable extent. Furthermore, the Greensburg company properties are further removed from the influence of union districts than are those of the other producing companies in the Connellsville district.

It may not be necessary for the coke and coal producers to make formal wage reductions, since a continuance of the present low rate of operation may lead the men to offer to work for lower wages in return for more regular employment.

International Exhibition in New Zealand

An International Exhibition is to be held in Dunedin, New Zealand, opening about Nov. 12, 1925. Though an exhibition company has been formed for convenience of organization, the undertaking is being planned and supported on the widest basis. The New Zealand Government has given its patronage to the project and is also assisting it financially. Though New Zealand is one of the youngest of the British Dominions, it has made great progress in less than a hundred years. This will be their fourth International Exhibition. The first, held in Dunedin in 1865, was naturally restricted in its scope, but at the second, also held in Dunedin, in 1889-90, half a dozen foreign countries, in addition to the United Kingdom and British colonies, were represented. The third International Exhibition, held in Christchurch in 1906-07, was a great success.

American Manganese Mfg. Co. Sold

Receiver's sale of the properties of the American Manganese Mfg. Co. took place Monday, April 28, at the office of the company, Bullitt Building, Philadelphia. As there were no other bidders the properties, consisting of two blast furnaces at Dunbar, Pa., coal mines and a half interest in a by-product coke plant, were bought by the bondholders. The plant has been shut down for some time. There will be a reorganization of the company and plans for resuming operations will be made.

A World Motor Transport Congress is to be held at the Hotel Statler, Detroit, May 21 to 24, inclusive. Besides sessions on various classes of automotive vehicles, there will be sessions on business promotion, on service, on financing and on highway construction. A series of luncheons has been arranged in honor of delegates from Asia and Australasia on the first day, for delegates from the Americas on the second, for delegates from the Near East and Africa on the third day, and for delegates from Europe on the fourth. The National Automobile Chamber of Commerce, New York, is taking a leading part in planning for the meeting and has developed a program of some 30 papers. An automotive maintenance equipment show also will feature the congress.

Competitive examinations for technologist and associate technologists to fill vacancies in the Bureau of Standards, Department of Commerce, have been announced. Application blanks may be obtained from the United States Civil Service Commission, Washington.

Movement of Metal Industries from Manhattan to Other Boroughs

Metal industries of New York show an increasing tendency to move plants out of Manhattan and Brooklyn and into New Jersey and Queens, it appears from a survey recently made by the Committee on Regional Plan of New York and Its Environs. Metal plants, said to be the largest employers of labor in the city, have a payroll of more than 250,000 employees. The tendency strongest among plants whose products are bulky, to drift away from the congested areas has been in progress for several years. Obviously, the chief reason for the migration is the need for larger tracts of land at rates such as no longer obtain in the heart of the city.

Only five iron foundries remain on Manhattan, where there once were 65, as shown in the survey. In 1900 there were 35 large metal plants producing heavy products south of Canal Street; in 1922 there were but 12. On the other hand, the metal industry in New Jersey continued to grow rapidly after the armistice, and that region is absorbing plants from other quarters as well.

It was further revealed in the report that 60 per cent of the aircraft built in the United States is constructed in the precincts of New York; that 55 per cent of the country's copper refining is done in that region, and about 37 per cent in or about Perth Amboy and Newark. The report was prepared by Vincent W. Lanfear, assistant professor of economics at Yale University.

Malleable Castings in March

Malleable castings produced in March by 129 plants amounted to 72,087 tons. Shipments were 65,003 tons, orders booked, 59,904 tons, and operations were 66.6 per cent of capacity, the latter being 108,164 tons monthly. These figures, given out April 29 by the Bureau of the Census, show improved conditions over February, when 126 plants with a capacity of 106,301 tons operated at a rate of 61.9 per cent and produced 65,829 tons, shipped 59,676 tons, and booked orders for 62,562 tons, the bookings being heavier than those for March.

Comparing 107 identical plants, the report shows that operations were 66.2 per cent in March as against 62 per cent in February. Production of these plants in March was 62,055 tons, shipments, 55,751 tons, and orders booked, 53,581 tons. Production in February of the same group of plants was 58,793 tons, shipments, 52,918 tons, and orders booked, 52,828 tons.

Puddlers' Wages Unchanged

YOUNGSTOWN, April 29.—Tonnage rates of puddlers and bar iron finishers for the May-June period remain unchanged from current levels as a result of the bimonthly examination of sales sheets conducted April 28 between representatives of the Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers. The average selling price of bar iron for the 60-day period ending April 20 was disclosed at 2.35c. per lb., unchanged from the previous settlement.

Puddlers now receive $13.13 per ton and are asking a $3 per ton advance on the base rate.

Youngstown Manufacturers Not Discouraged by Present Dullness

YOUNGSTOWN, April 29.—While current steel buying is largely reduced, as compared with the buying movement the first two months of the year, nevertheless district steel producers are hopeful for an early return to more normal conditions. Virtually all finished steel lines have been affected, as reflected by a declining production rate. New merchant car business is very weak, while plate tonnage has also fallen away.

Much of the buying at present is for immediate requirements and is therefore of the hand-to-mouth variety. Manufacturing consumers are not buying beyond their needs and are consequently at times pressed for material. Makers say that stocks in hands of jobbers are low, and look for replenishment buying in the not distant future.

In short, Valley interests refuse to be discouraged by the aspects of the situation, believing that the slump was caused by artificial means and is due to superficial causes. There is nothing fundamentally wrong with conditions, they maintain.

Further Reduction of Operations in the Mahoning Valley

YOUNGSTOWN, April 29.—Further reflecting the decline in iron and steel buying is the reduced operating rate of Mahoning Valley properties. Makers however, look for an upturn at an early date.

Two blast furnaces are scheduled to be blown out this week in the Valley—the stack at Girard of the A. M. Byers Co., Pittsburgh, and the merchant furnace at Struthers of the Struthers Furnace Co. The latter part of last week, No. 1 stack in the Haselton group of the Republic Iron & Steel Co. was banked. These suspensions reduce the active stacks in the Youngstown district to 28, of a total of 45.

Steel ingot output is being operated this week at 60 per cent, with finishing mills averaging proportionately.

For the first time this year, tube production has declined. The Republic company has suspended two of its six mills and the Youngstown Sheet & Tube Co. one, leaving 13 of 17 pipe mills active.

The Sharon Steel Hoop Co. and the Republic company have suspended their sheet mill departments. This week the active sheet mill list is cut to 64 rolling mills, of 120 in the Mahoning Valley, the lowest rate of the year. Some of the active mills are operating only part time.

The Carnegie Steel Co., which until recently maintained production at a rate close to normal, has adopted the policy of the independents in reducing output to the level of incoming business. Its operations in the Youngstown district this week average 65 per cent.

Ohio Foundry Operations

The report of the Ohio State Foundrymen's Association, Cleveland, for March shows operations at 79 per cent of capacity compared with 74 per cent in February and with 83 per cent in March, 1923. Stocks on hand increased to 84 per cent compared with 78 per cent in February and with 95 per cent in March, 1923. Non-ferrous operations showed a slight decline in February.

In celebrating its 50th anniversary, *Engineering News-Record* as of April 17 was impressive in the amount and character of its reading text and advertising pages, the whole running up to 512 pages. *Engineering News* was founded in 1874, being known until January, 1875, as *Engineer and Surveyor. Engineering Record*, which was merged with *Engineering News* in April, 1917, was founded in New York in December, 1877, as the *Plumber and Sanitary Engineer*. Noteworthy in the golden anniversary number is a symposium by more than a score of engineers who have been engaged in engineering and construction work for the major part of the 50 years. They wrote in answer to the question, "What is the essential difference you remark between engineering today and engineering when you started practice?" Sixteen specially contributed articles include, "Bridge Engineering," by Gustav Lindenthal; "Industrial Building Since 1874," by Charles T. Main; "Growth of Steel Frame Buildings," by H. J. Burt; "Half a Century of Road Progress," by C. S. Hill; Hydroelectric Power," by J. D. Galloway, and "Railroad Engineering Through the Half Century," by William Hood. The number in its entirety is a worthy monument to the civil engineering and construction progress of the half century and also to the great advance made by technical journalism, more especially in the last two decades.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.25c. to 2.30c.

Structural Materials

Beams, channels, etc., base, per lb.....2.25c. to 2.35c.
Sheet piling .....2.35c. to 2.50c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.25c. to 2.30c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.30c. to 2.40c.
Refined iron bars, base, per lb.....3.10c to 3.15c.
Double refined iron bars, base, per lb.....4.75c.
Stay bolt iron bars, base, per lb.....7.75c. to 8c.

Hot-Rolled Flats

Hoops, base, per lb.....2.75c. to 2.90c.
Bands, base, per lb.....2.75c. to 2.90c.
Strips, base, per lb.....2.75c.

Cold-Finished Steel

Bars and shafting, base, per lb.....3c.
Bars and shafting, l.c.l., per lb.....3.25c.
Bars, S. A. E. Series, No. 2100.....4.75c.
Bars, S. A. E. Series, No. 2300.....6.25c.
Bars, S. A. E. Series, No. 3100.....5.25c.
Strips, base, per lb.....4.75c.

Wire Products

(To jobbers in car lots)

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in..... 2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....$2.75
Annealed fence wire, base, per 100 lb..... 2.90
Spring wire, base, per 100 lb..... 3.70
Galvanized wire No. 9, base, per 100 lb..... 3.35
Galvanized barbed, base, per 100 lb..... 3.80
Galvanized staples, base, per keg..... 3.80
Painted barbed wire, base, per 100 lb..... 3.45
Polished staples, base, per keg..... 3.45
Cement coated nails, base, per count keg.....$2.50 to 2.60
Bale ties, carloads to jobbers.....75 and 2½ per cent off list
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads,
60, 10 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads,
60, 10 and 10 per cent off list
Carriage bolts, cut threads, all sizes.60 and 10 per cent off list
Lag bolts .....65, 10 and10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads..50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,
50, 10 and 10 per cent off list
Larger and longer sizes.....50, 10 and 10 per cent off list
Hot pressed squares or hex. nuts, blank.4.75c. to 5c. off list
Hot pressed nuts, tapped.....4.75c. to 5c. off list
C.p.c. and t. square or hex. nuts, blank.....4.25c. to 4.50c.
C.p.c. and t. square or hex. nuts, tapped.....4.25c. to 4.50c.
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S.....80, 10 and 5 per cent off list
⅞ in. and larger, U. S. S.....75 and 10 per cent off list
Small sizes, S. A. E.....80, 10 10 and 5 per cent off list
S. A. E., ⅝ in. and larger....75, 10 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Bolt ends with cold pressed nuts.....50 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
50 to 55 and 5 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
65 and 5 to 70 and 10 per cent off list
Washers .....5c. to 5.25c. off list

Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000 S. A. E.	Per 1000 U. S. S.		Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$4.25	$4.25	⅞-in.	$13.25	$13.50
5/16-in.	4.90	4.90	1-in.	16.25	16.50
⅜-in.	5.90	6.25	1⅛-in.	22.50	23.00
7/16-in.	7.50	8.50	1¼-in.	34.00	34.00
½-in.	9.75	10.00	1-in.	53.00	55.00

Larger sizes—Prices on application.

Cap and Set Screws

Milled hex. head cap screws.....75, 10 and 5 per cent off list
Milled standard set screws, case hardened,
75, 10 and 5 per cent off list
Milled headless set screws, cut thread,
75, 10 and 5 per cent off list
Upset hex. head cap screws, U. S. S. thread,
80, 10 and 10 per cent off list
Upset hex. head cap screws, S. A. E. thread,
80, 10 and 10 per cent off list
Milled studs .....65 and 10 per cent of list

Rivets

Large structural and ship rivets, base, per 100 lb.$2.65 to $2.75
Small rivets .....70 and 10 per cent off list

Track Equipment

Spikes, ⅜ in. and larger base, per 100 lb.....$2.90 to $3.00
Spikes, ½ in., ⅜ in. and ⅝ in., per 100 lb..... 3.25 to 3.40
Spikes, ⅞ in.....3.25 to 3.40
Spikes, boat and barge, base, per 100 lb..... 3.25 to 3.40
Track bolts, ¾ in. and larger, base, per 100 lb.. 4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb.. 4.50 to 5.00
Tie plates, per 100 lb..... 2.55
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	½ to ⅜	+19	+54
½	52	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2½ to 4	57	46¼	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discount of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+13
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn			
1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2¾ in.	32		

Hot Rolled			
3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in...	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage	15	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.O. 10 gage	17	1⅛-in. O.D. 9 gage	15
2¼-in. O.D. 12 gage	17	5⅛-in. O.D. 9 gage	55
2¼-in. O.D. 11 gage	18	5½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C.	$14.90
8-lb. coating I. C.	11.30	25-lb. coating I. C.	16.20
12-lb. coating I. C.	12.70	30-lb. coating I. C.	17.35
15-lb. coating I. C.	13.95	35-lb. coating I. C.	18.35
		40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.85c. to 3c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.60c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb., 5.10c. to 5.35c.

Galvanized

No. 28 (base), per lb.....4.30c. to 4c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$5.65
Old range non-Bessemer, 51½ per cent iron	4.90
Mesabi Bessemer, 55 per cent iron	5.40
Mesabi non-Bessemer, 51½ per cent iron	4.75

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11.00c.
Iron ore, Swedish, average 66 per cent iron	9.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	45c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	42c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.75 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	19.00 to 22.00
Molybdenum ore, 85 per cent concentrates, per lb, of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$107.50
Ferromanganese, British, 80 per cent f.o.b. Atlantic port, duty paid	107.50
Ferrosilicon, 50 per cent, delivered	75.00
Ferrosilicon, 75 per cent	140.00
Ferrotungsten, per lb. contained metal	90c. to 93c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	10.75c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb	10.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	$90.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent	$36.00 to $37.00
Spiegeleisen, domestic, 16 to 19 per cent	35.00 to 36.00

Ferrosilicon, Bessemer, 10 per cent, $41.50; 11 per cent, $44; 12 per cent, $46.50; 14 to 16 per cent, (electric furnace) $40.00.

Silvery iron 5 per cent, $29.00; 6 per cent, $30.00; 7 per cent, $31.00; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39.00; 12 per cent, $41.50.

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$20.00 to $22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	22.00 to 23.50

Per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois	——	37.00 to 42.00
Missouri	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton		6.00 to 7.00
Silica Brick:		
Pennsylvania		38.00 to 40.00
Chicago		49.00
Birmingham		50.00
Ground silica clay, per net ton		8.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		47.00

Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00
Rolling billets, 2-in. and under	40.00
Forging billets, ordinary carbons	45.00
Sheet bars, Bessemer	41.00
Sheet bars, open-hearth	41.00
Slabs	40.00
Wire rods, common soft, base, No. 5 to ⅜-in.	51.00
Wire rods, common soft, coarser than ⅜-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon, 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb	2.25c. to 2.30c.
Skelp, sheared, per lb	2.25c. to 2.30c.
Skelp, universal, per lb	2.25c. to 2.30c.

Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, lb	2c.
Rails, light, rerolled, base, per lb	1.85c. to 1.90c.
Spikes, ⅞-in. and larger, base, per 100 lb	$2.90 to $3.00
Spikes, ½-in. and smaller, base, per 100 lb	3.25 to 3.40
Spikes, boat and barge, base, per 100 lb	3.25 to 3.40
Track bolts, ⅝-in. and smaller, base, per 100 lb	4.50 to 5.00
Track bolts, ¾-in. and larger, base, per 100 lb.	4.00 to 4.25
Tie plates, per 100 lb	2.55
Angle bars, per 100 lb	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rail steel reinforcing, base, per lb.	2.10c. to 2.15c.
Rail steel bars, base, per lb., Chicago mill	2.20c.
Cold finished steel bars, base, Chicago, per lb.	3c.
Ground shafting, base, per lb	3.40c.
Cut nails, base, per keg	$3.00 to $3.15

Alloy Steel

S. A. E. Series Numbers	Bars 100 lb.
2100*(½% Nickel, 10 to 20 per cent Carbon)	$3.50
2300 (3½% Nickel)	5.00
2500 (5% Nickel)	$6.50 to 7.00
3100 (Nickel Chromium)	4.00
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75
5200*(Chromium Steel)	7.50 to 8.00
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silicon Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	4.75
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.75 to 5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analysis. On smaller than 4 x 4-in. billets the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, carload lots, 36,000 lb. minimum carload, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43	*Pacific Coast	$1.15
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735	*Pac. Coast, ship plates	1.20
Baltimore, domestic	0.31	Cleveland, Youngstown Comb.	0.19	Kansas City (pipe)	0.705	Birmingham	0.55
Baltimore, export	0.225	Detroit	0.29	St. Paul	0.60	Memphis	0.56
New York, domestic	0.34	Cincinnati	0.29	Omaha	0.735	Jacksonville, all rail	0.70
New York, export	0.255	Indianapolis	0.31	Omaha	0.705	Jacksonville, rail and water	0.415
Boston, domestic	0.365	Chicago	0.34	*Denver	1.15	New Orleans	0.67
Boston, export	0.255			†Denver (pipe)	1.17		

*Applies minimum carload 30,000 lb. †Minimum loading 46,000 lb.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingots and muck bars, structural steel, common wire products, including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All rates per 100 lb. in carload lots, minimum 36,000 lb.

FABRICATED STEEL BUSINESS

Bookings of 29,000 Tons and Fresh Inquiries of 24,000 Tons

Bookings of structural steel work in the past week amounted to 27,000 tons, or considerably better than the previous week, 20,000 tons, and comparing favorably with the weekly average of 28,000 tons, based on the reports in THE IRON AGE since the first of the year. Fresh inquiries call for 24,100 tons. Awards include the following:

Central Railroad of New Jersey, lift spans for bridge across Newark Bay, 8000 tons, to Bethlehem Steel Co.

Office building, Sixth Avenue and Forty-second Street, New York, 600 tons, to Levering & Garrigues Co.

New York Edison Co., addition to sub-station, Twenty-seventh Street, New York, 100 tons, to Hedden Iron Construction Co.

Tigo Realty Co., apartment building on Sixty-ninth Street, New York, 250 tons, to Hay Foundry & Iron Works.

Public schools Nos. 82 in the Bronx and 220 in Brooklyn, totaling 1000 tons to American Bridge Co.

Public School No. 26, Queens Borough, New York, 600 tons, to Bethlehem Steel Co.

Mississippi Glass Co., St. Louis, plant addition, 250 tons, to Mississippi Structural Steel Co.

Virginian Railway, sub-station, 800 tons, reported awarded to Virginia Bridge & Iron Co.

Thomas Maddock's Sons Co., Trenton, N. J., sanitary ware manufacturing plant, 2000 tons, to McClintic-Marshall Co.

Rose Construction Co., apartment building, Walnut Street, Philadelphia, 1000 tons, to Phoenix Bridge Co.

Hancock and Sullivan Counties, Massachusetts, bridge, 800 tons, to American Bridge Co.

General Electric Co., Pittsfield, Mass., plant addtiion, 700 tons, to American Bridge Co.

Forsyth, N. Y., bridge, 350 tons, to McClintic-Marshall Co.

Los Angeles Harbor Department, two-story transit sheds, 4258 tons, to American Bridge Co.

Los Angeles Traction & Electric Co., power station, 1700 tons, to Minneapolis Steel & Machinery Co.

Berkeley, Cal., main office building, 643 tons, to Ralston Iron Works.

Denver, Colo., bank building, 500 tons, to Minneapolis Steel & Machinery Co.

School, Denver Colo., 400 tons, to Paxton-Vierling Co.

Rockford National Bank, Rockford, Ill., addition, 200 tons, to Hansell-Elcock Co.

Illinois Tool Works, Chicago, plant building, 275 tons, to A. Bolters' Sons Co.

Masonic Temple, Oshkosh, Wis., 200 tons, to Worden-Allen Co.

Columbus Dispatch, Columbus, Ohio, office building, 600 tons, to International Derrick & Equipment Co.

U. S. Engineers' Office, Florence, Ala., 58 regulation gates, 2005 tons, McClintic-Marshall Co. low bidder on delivered basis; Newport News Shipbuilding Co. low bidder on delivered and erected basis.

Union Gas & Electric Co., Cincinnati, sub-station, 400 tons, to Fort Pitt Bridge Works.

Nichols School, Buffalo, 150 tons, to Buffalo Structural Steel Co.

Citizens Building, Cleveland, remodeling, 140 tons, to Republic Structural Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Firemen's Insurance Building, Newark, N. J. 500 tons.

Houbigant, Inc., office building, West Forty-fifth Street, New York, 1500 tons.

Hudson County Hospital, Secaucus, N. J., 600 tons.

Public Service Corporation of New Jersey, a few hundred tons, for work at Kearny, N. J.

New York Telephone Co., building at Rockville Center, Long Island, 200 tons.

Loft building, West Forty-fifth Street, New York, 500 tons.

Salaam Temple, Newark, N. J., 1000 tons; this project has been up before but did not go ahead.

J. G. White Engineering Corporation, New York, taking figures on eight apartment houses requiring a few thousand tons of steel.

Central Railroad of New Jersey, bridge, 300 tons.

Transit Commission of New York, subway construction known as the De Kalb Avenue extension, 4300 tons; Oakdale Contracting Co. low bidder but steel not definitely awarded.

Eastern States Exposition, Springfield, Mass., addition, 500 tons.

Roosevelt Hotel, New Orleans, 4000 tons.

Theater, Mount Vernon, N. Y., 300 tons.

Transit Commission of New York, storage shed, 1400 tons.

Transit Commission of New York, repair shop at Coney Island, 700 tons.

Nebraska Power & Light Co., Omaha, power house, 250 tons.

Pere Marquette Railroad, car ferry, 2500 tons.

U. S. Engineers' Office, St. Louis, 12 steel dredge-pontoons, estimated 1080 tons, bids close May 9.

Illinois Central Railroad, transfer boat, 1500 tons, bids being taken.

Tomahawk, Wis., Tomahawk Avenue bridge, 380 tons, bids closed April 29.

Industrial Arts School, Springfield, Mass., 479 tons.

Lynn Gas & Electric Co., Lynn, Mass., gas furnace, 450 tons.

Girls High School, Roxbury, Boston, 560 tons.

Masonic Home, Springfield, Ohio, 600 tons.

Hamilton County bridge, Milford, Ohio, 500 tons.

RAILROAD EQUIPMENT BUYING

No New Inquiries of Size—Chesapeake & Ohio Buys 100 Locomotives

No fresh inquiries of size came to light for either cars or locomotives. The award of 100 locomotives for the Chesapeake & Ohio disposed of the locomotive business. Inquiries for 30 freight cars and 100 underframes appeared. The chief items are as follows:

The Chesapeake & Ohio Railroad has ordered 100 Mikado type locomotives from the American Locomotive Co.

The Nickel Plate is inquiring for 100 steel under frames for freight cars.

The American Steel & Wire Co. has revived an inquiry for 20 70-ton gondola cars.

The Detroit, Toledo & Ironton is in the market for 10 tank cars of 10,000-gal. capacity, 2 to 3 coaches, 2 to 3 baggage and mail cars, and 1 to 2 combination passenger and smoking cars.

The New York Central is inquiring for 25 suburban cars for the Boston & Albany.

The El Paso & Southwestern placed 1 dining and 3 buffet baggage cars with the American Car & Foundry Co.

The Santa Fe is inquiring for 20 baggage cars.

Standard Designations for Steel Towers Agreed Upon

WASHINGTON, April 29.—Representing 80 per cent of the capacity of the industry, manufacturers of steel towers, together with representatives of the American Institute of Architects and the associated factory mutual fire insurance companies met today under the auspices of the Division of Simplified Practice, Department of Commerce, and adopted two standard designations. The first designates the height of the tower to be considered as the distance from the top of the foundation to the bottom capacity line of the tower. The second designates the capacity to be the number of United States gallons of water available above the outlet opening. Tentative agreement was reached covering 15 sizes of towers ranging from 5000 to 500,000 gal. capacity.

Manufacturers Will Not Grant Demands of Amalgamated

YOUNGSTOWN, April 29.—District independent steel interests indicated today they would be unable to comply with wage demands to be presented at the annual wage conference by puddlers, bar iron finishers, sheet and tin mill workers. Current conditions militate against advances on the base rate which have been formulated by workers, through the Amalgamated Association of Iron, Steel and Tin Workers, say the employers.

Among Valley independents affected are the Republic Iron & Steel Co., Trumbull Steel Co., Sharon Steel Hoop Co., Newton Steel Co., Youngstown Sheet & Tube Co. in its Brier Hill Division, and the A. M. Byers Co., Pittsburgh, at its Girard, Ohio, works.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin (Spot)	Lead		Zinc	
April	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
23.....	13.62½	13.25	49.75	7.90	7.62½	6.47½	6.12½
24.....	13.62½	13.25	49.00	7.90	7.62½	6.47½	6.12½
25.....	13.62½	13.12½	48.62½	7.87½	7.50	6.42½	6.07½
26.....	13.62½	13.12½	....	7.87½	7.50	6.40	6.05
28.....	13.62½	13.12½	48.75	7.87½	7.50	6.35	6.00
29.....	13.62½	13.12½	48.25	7.87½	7.50	6.35	6.00

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, April 29.

There is very little improvement in demand and prices are generally easier. Buying of copper has improved a little at lower prices. The tin market is without change or feature. The decline in lead has continued and the zinc market has developed further weakness.

Copper.—The present weakness in the copper market is due to a rather peculiar international situation. The Germans are said to have bought considerable copper with the expectation of paying for it in francs which were then on the decline. The sudden advance in the francs spoiled these plans and American sellers who took the orders now find the buyers unable to absorb it and the result is a freer offering, particularly for foreign consumers, and a corresponding weakness here. In other words, the market is under the influence of a speculative movement of considerable magnitude and, until the influence of this is removed, higher prices are not looked for. The domestic market is mixed, depending on the attitude of various sellers. Metal from some producers and second hands is obtainable and has sold as low as 13.37½c., delivered, and other producers are asking 13.50c. and 13.62½c., with some sales at these levels. One large producer reports very satisfactory business during the last week with sales as high as 13.62½c., delivered in the Connecticut Valley. The opinion is freely expressed that the metal is close to the bottom at the lowest price and that the situation is not as unfavorable as described in some quarters. Lake copper is close to 13.62½c., delivered.

Tin.—Dullness has prevailed most of the week. A fair business was done Friday, April 25, when the London market declined about £6 per ton. On that day about 500 tons changed hands, the bulk of it bought by one dealer. On other days, including yesterday and today, the market has been dull to stagnant. The feature has been the fact that spot and April and May shipment, metal have remained firm. The bulk of the tin arrivals is apparently going to consumers with the rest held by strong interests. Consumers as a rule show little interest and there is no buying for July and later periods. The market is looking forward to the time when the books for third quarter tin plate orders are opened and it is rather expected that buying of tin will be somewhat smaller and extend for a shorter period than has characterized earlier buying movements of the metal. This opinion is based on the supposition that demands on the tin plate mills will be less later in the year than in recent months. Bearish influences are still at work but, in the opinion of some importers, lower prices are not likely. The only time when the market shows any life is when dealers are active, as consumers refuse to buy. Spot Straits tin today is quoted at 48.25c., New York. Prices in London are about £7 per ton less than a week ago, with spot standard quoted at £240 15s., future standard at £240 15s. and spot Straits at £242 5s. Arrivals thus far this month have been 8795 tons, with 4140 tons reported afloat.

Lead.—The rapid decline has apparently ceased and the market is steadier though dull. It has remained at the present levels for several days, the outside market being quoted at 7.50c., St. Louis, and 7.87½c., New York. The leading interest still maintains its contract price at 8c., New York. There was a good inquiry yesterday and consumers have been out of the market for a long time. Production of the metal is overtaking consumption, which is falling off, and the decline in prices may go further, though some do not expect it.

Zinc.—Lower prices for prime Western have continued to develop until today the market is easy at 6c., St. Louis, or 6.35c., New York. These levels are considerably below the cost of production with ore at $39 to $40 per ton. At the 6c. level there has been a little better inquiry with some sales, but the market is not at all active. Export selling is not possible at the present levels.

Nickel.—Shot and ingot nickel quotations are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 30c. to 32c. by the leading producers. Both shot and ingot nickel in the outside market are quoted at 28c. to 32c. per lb.

Antimony.—The market is easier with almost no demand and quotations are nominal at 9c. to 9.25c., New York, duty paid, for Chinese metal in wholesale lots. Were there any demand this price could probably be shaded, as holders are anxious for orders.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 27c. to 28c. per lb., duty paid, delivered.

Old Metals.—The market is unsettled and business is quiet. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.75
Copper, heavy and wire	12.00
Copper, light and bottoms	11.00
Heavy machine composition	10.75
Brass, heavy	8.25
Brass, light	6.75
No. 1 red brass or composition turnings	9.25
No. 1 yellow rod brass turnings	7.75
Lead, heavy	6.75
Lead, tea	5.50
Zinc	4.75
Cast aluminum	17.00
Sheet aluminum	17.50

Chicago

APRIL 29.—Prices have declined in a dull market. However, export demand for copper is expected to revive as a result of the Dawes report. In fact, German importers have already placed some orders in anticipation of the acceptance of the Dawes settlement. We quote in carload lots: Lake copper, 13.75c.; tin, 50.50c.; lead, 7.75c.; spelter, 6.05c.; antimony, 11.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9c.; red brass, 8.50c.; yellow brass, 7c.; lead pipe, 6c.; zinc, 4c.; pewter, No. 1, 27c.; tin foil, 31c.; block tin, 37c.; all buying prices for less than carload lots.

John Fritz Medal Conferred on Ambrose Swasey

Ambrose Swasey, upon whom recently was conferred the degree of doctor of laws by the University of California, was awarded the John Fritz gold medal in the Engineering Societies Building, New York, on Wednesday evening, April 23, "for achievement as a designer and manufacturer of instruments and machines of precision, a builder of great telescopes, a benefactor of education, and the founder of Engineering Foundation."

Addresses were made by Charles F. Rand, chairman of the John Fritz Medal Board of Award; Dr. William Wallace Campbell, president of the University of California and director of Lick Observatory; General William Crozier, formerly chief of ordnance, United States Army, and Dr. John R. Freeman, past president of the American Society of Civil Engineers and the American Society of Mechanical Engineers.

PERSONAL

Paul C. De Wolf, assistant treasurer of the Brown & Sharpe Mfg. Co., Providence, R. I., manufacturer of machine tools and mechanics' fine tools, was elected president of the National Metal Trades Association at its twenty-fifth annual convention, held at the Hotel Astor, New York, on Wednesday and Thursday, April 23 and 24. Mr. De Wolf, although one of the younger members of the association, has been active in its affairs for some years, and served during the past year as second vice-president and as a member of the finance committee. Mr. De Wolf was not present at the convention because of slight injuries received recently in an automobile accident.

PAUL C. DE WOLF

O. C. Radford, formerly Branch manager at New Orleans, has been appointed manager of the Atlanta branch of the Graton & Knight Mfg. Co., makers of leather belting, Worcester, Mass. Mr. Radford will make his home in Atlanta and will have charge of all sales in North Carolina, Florida, Alabama, Georgia and sections of Tennessee and Mississippi. M. J. Kennedy, who has been with the company four years at the main factory and at the Atlanta office, will cover South Carolina.

R. I. Miner has been engaged as a consulting engineer by the Youngstown Pressed Steel Co. He will be located at Warren, Ohio.

D. A. Burke has been elected president and general manager of the Peerless Motor Car Co., Cleveland. He was formerly vice-president and general manager and has been the active head of the company since the retirement of Richard Collins as president several weeks ago.

L. A. Marshall, for many years service manager of the Industrial Works, Bay City, Mich., is now connected with the Chicago office, 1051 McCormick Building as sales engineer.

C. F. Hutchins, formerly with the New England Coal & Coke Co., latterly with E. Arthur Tutein, Inc., has joined the Boston organization of Waldo, Egbert & McClain, Inc., at 111 Devonshire Street.

William Lintern, president Nichols-Lintern Co., Cleveland, manufacturer of railroad, vehicle and mill supplies, will sail for Europe, May 8, for an extended business trip.

George M. Judd, secretary American Brake Shoe & Foundry Co., has been elected a director to succeed the late Waldo H. Marshall.

E. P. Smith, president Green Bay Foundry & Machine Co., maker of paper and pulp mill machinery, Green Bay, Wis., has retired, disposing of his entire interests to other stockholders. R. A. North, vice-president and general manager, has been elected president, and C. F. North becomes vice-president and sales manager. C. Ennis continues as secretary-treasurer.

Irving A. Pfeil, of the Chicago office, Blaw-Knox Co., has been appointed manager of the Detroit branch, succeeding Herbert J. Desson, who died recently. Mr. Pfeil was graduated in civil engineering at Ohio Northern University. During the World War he served as lieutenant in the aviation division and since 1919 he has been with the Blaw-Knox Co.

Ira D. Grove, formerly sales representative for Landis Tool Co. in Cleveland and Detroit territory, has been appointed sales manager of the Lees-Bradner Co., Cleveland, effective May 1, to succeed Glen Muffly, who is opening an office in Chicago as consultant on the merchandising of automotive and mechanical products.

J. T. Shelton, who has been connected with the Corbin Screw Corporation, New Britain, Conn., for 25 years, 15 years as assistant to William Bishop, who recently retired as manager of the New York office, has succeeded Mr. Bishop in that capacity.

Clifton Reeves, who for the last five years has been industrial engineer for the Willys-Overland Co. at Toledo, Ohio, has opened offices at 149 Broadway, New York, where he will engage in a general industrial engineering practice.

T. W. Robinson, vice-president Illinois Steel Co., Chicago, recently returned from a sojourn of nearly a year in Egypt and other Mediterranean countries. He was accompanied by Mrs. Robinson and their daughter.

M. J. Luther has resigned from the sales department of the Foster Machine Co., Elkhart, Ind., to become sales representative at Chicago for the Kearney & Trecker Corporation, Milwaukee.

Charles A. Coffin, formerly president of the General Electric Co., was awarded a certificate of honorary membership in the Franklin Institute on April 16, in recognition of his many achievements in the electrical industry. Mr. Coffin is the twenty-eighth person to be so honored.

Gilbert H. Johnson of Spuyten Duyvil, N. Y. has become associated with the Farrell-Cheek Steel Foundry Co., maker of small castings, Sandusky, Ohio, as eastern sales representative, with headquarters at Spuyten Duyvil. He was for a period of five years sales manager of Isaac G. Johnson & Co. of Spuyten Duyvil, and was connected with the company in that capacity at the time they discontinued operation of the steel foundry several months ago.

GILBERT H. JOHNSON

E. W. Allen, formerly engineer and assistant manager of the central district of the General Electric Co., with headquarters in Chicago, has been appointed manager of the company's engineering department. He was born in Buchanan, Va., in 1880, and was graduated from Virginia Polytechnic Institute in 1900. Since then he has been with the General Elctric Co., having been appointed engineer of the Chicago district in 1911. Two years later he was made assistant district manager in addition to his duties as engineer. After two years of military service during the World War he resumed his duties with the company. A. F. Riggs has been named district engineer to succeed Mr. Allen.

W. A. Thomas, steel manufacturer of the Mahoning Valley, former president of the Brier Hill Steel Co., back from a trip through Egypt and several European countries, is optimistic over the outlook both here and abroad. He believes somewhat rapid improvement in European conditions may be expected, voicing belief that the Dawes reparation program provides the basis for an adjustment of postwar disputes.

Lawrence F. Miller, who has been assistant manager of the Pittsburgh district sales office of the Carnegie Steel Co., has been named assistant manager of sales for the company's St. Louis district. His successor in Pittsburgh is John J. Moakley.

G. Robert Osgood, formerly connected with the Edgar T. Ward Sons Co., Newark, N. J., has associated himself with the Adams & Durkee Steel Co., 287 Atlantic Avenue, Boston, as vice-president.

OBITUARY

LEIGH BEST, senior vice-president, American Locomotive Co., died April 27 in Roosevelt Hospital, New York, at the age of 56. He was born at Chatham, N. Y., and after studying law with a Utica firm entered the legal department of the New York Central as assistant to President S. R. Callaway. When Mr. Callaway went with the American Locomotive Co., Mr. Best also went as secretary of the company. He was a member of the Engineers' Club.

EDWIN COWLES SPEAR, treasurer and general manager Cheney Bigelow Wire Works, Springfield, Mass., died April 18 at his home in that city, aged 68 years. Aside from a short time spent in the dry goods business early in life, Mr. Spear was associated with the Cheney Bigelow works practically all his business life, becoming treasurer and general manager several years ago.

HERBERT J. DESSON, manager of the Detroit office of the Blaw-Knox Co., died, after a brief illness on April 16, aged 44 years. He was born in Cleveland and received a general education in the public schools of that city. He went with the Blaw-Knox Co. in 1916, and three years later was placed in charge of the Detroit branch.

JOHN MANSFIELD REDFIELD, president Redfield, Fisher & Wallace, Inc., 105 West Fortieth Street, New York, died April 25.

JOHN E. PARKER, who went to Northville, Mich., a few weeks ago to become manager of the Bell Furnace & Foundry Co., died there on April 17.

HARVEY S. PATTERSON, who for several years had been identified with the railroad department of the general sales office, Walworth Mfg. Co., at Boston, died April 6 at the Norfolk County Hospital, Mass., aged 38 years.

Reduced Operations in the Buffalo District

BUFFALO, April 29.—Some curtailment has taken place in local mill and furnace operation. The Lackawanna plant of Bethlehem Steel Co. has five blast furnaces, two Bessemer converters and eleven open-hearths in operation. Six mills are on double turn, three mills on single turn and three idle. The idle mills are the blooming mill, one of the billet mills and the 82-in. merchant bar mill. This condition fluctuates from day to day. Lackawanna coke ovens are running full.

The new blooming mill being installed at Lackawanna will be a 40-in mill with motor drive. Operation was discontinued on the old mill on Sunday and it will be down until about May 15, when it will be operated with the new drive.

The Donner Steel Co. is operating two blast furnaces and five open hearths. It will put its No. 1 blast furnace out of blast shortly, probably about May 1, for relining. The Donner company is operating all its bar mills.

The Wickwire-Spencer Steel Corporation has two blast furnaces blowing and two of its four open-hearths. Seneca Iron & Steel Co. has nine of its 14 sheet mills in operation.

The Rogers Brown Iron Co. is still operating its four blast furnaces, and Hanna Furnace Co. has two of its three local stacks in blast, though the Port Colborne, Ont., furnace is down. This has been the rate of operation for some months.

The Tonawanda Iron Corporation has its one furnace down for extensive repairs that will probably be completed by August. The Charlotte stack of the McKinney Steel Co. has been idle for some time.

The Pittsburgh chapter of the American Association of Engineers celebrated its sixth birthday, March 25, with conferences, tours, luncheon and a dinner at the Fort Pitt Hotel.

MARCH AUTOMOBILE PRODUCTION

Close to Record Figures of Last Year—First Quarter's Output Up 200,000 Cars

Figures of the Department of Commerce show a production in March of 348,396 passenger cars and 34,063 trucks, an aggregate of 382,459 vehicles. With the exception of last May, with 350,410 cars, the March figure for passenger cars is the greatest for any month in the history of the industry. As to trucks, there were four months last year which exceeded the current figures, the largest being May, with 43,678.

For the first quarter the figures show 972,071 cars and 94,009 trucks, making a total of 1,066,080 vehicles in three months. This is considerably ahead of last year (itself a new high record) when the first quarter showed 798,362 cars and 77,141 trucks, or a total of 875,503 vehicles.

For 13 successive months the production of motor vehicles has exceeded 300,000 cars and trucks in every month. The 200,000-mark has been exceeded now in every one of the last 24 months. This is shown by the figures in the table.

United States Production of Motor Vehicles

1922	Passenger Cars	Trucks	Total
January	81,696	9,576	91,272
February	109,171	13,350	122,521
March	152,962	20,022	172,984
April	197,224	22,640	219,864
May	232,462	24,097	256,559
June	263,053	26,298	289,351
July	225,086	22,046	247,132
August	249,492	24,692	274,184
September	187,694	19,462	207,156
October	217,566	21,795	239,361
November	215,852	21,949	237,301
December	208,010	20,354	228,364
Year	2,339,768	246,281	2,586,049
1923			
January	223,819	19,720	243,539
February	254,773	22,161	276,934
March	319,770	35,260	355,030
April	344,639	38,056	382,695
May	350,410	43,678	394,088
June	337,362	41,145	378,507
July	297,330	30,663	327,993
August	314,373	30,829	345,202
September	298,911	28,638	327,549
October	335,023	30,166	365,189
November	284,923	28,070	312,993
December	275,439	27,744	303,183
Year	3,636,772	376,130	4,012,902
1924			
January	287,302	28,850	316,152
February	336,373	31,096	367,469
March	348,396	34,063	382,459
Quarter	972,071	94,009	1,066,080
27 months	6,948,611	716,420	7,665,031

March Refractories Statistics

Variation between March and February clay firebrick statistics as compiled by the Refractories Manufacturers Association was slight. Shipments were smaller in March than in the previous month, but in relation to the capacity reporting the March shipments were 1 per cent greater than in February. Capacity reporting for March was 51,132,200, against 54,657,300 in February, and the shipments were 38,111,554, or 74 per cent of monthly economical producing capacity in March, compared with 40,026,883 or 73 per cent of capacity of manufacturers who reported in February. Net new business in March was 38,438,850 9-in. equivalent brick, as compared with 46,991,348 in February, the percentages to capacity being 75 and 86, respectively. Stocks on hand on March 31 were 138,191,542, of which 70,222,588 represents the "free" stocks, or that which could be made to apply on new orders. The "free" stock exceeds by almost 20,000,000 brick the unfilled orders at the end of March, which were 50,632,764.

Silica brick figures for March based upon reports of less capacity than in February disclose shipments of 6,464,762, against 6,521,783 in February; net new business 5,386,479, against 8,036,238 in the previous month; stocks on hand as of March 31, of 12,950,174, compared with 14,799,759 on Feb. 29; "free" stocks of 7,101,122 as compared with 7,305,221 on Feb. 29, and unfilled orders at the end of March were 9,788,665, against 11,881,647 a month before.

March Steel Exports Lowest in 14 Months

Reduction Due to Falling Off in Japanese Purchases— Imports About at Average of Preceding Eight Months

WASHINGTON, April 29.—Aggregating only 123,618 gross tons, valued at $17,493,058, exports of iron and steel products in March of this year were the lowest since January, 1923, when the total was 123,190 tons. The decline in exports has been sharp since January of this year, when they amounted to 247,942 tons, falling to 164,820 tons in February.

Imports of Iron and Steel Into the United States

(In Gross Tons)

	March		Nine Months Ended March	
	1923	1924	1923	1924
Pig iron	72,344	16,919	549,118	116,626
Ferromanganese	8,082	1,841	87,340	48,497
Ferrosilicon	948	2,100	13,930	9,540
Scrap	20,047	8,375	169,640	64,556
Steel ingots, blooms, billets, slabs and steel bars	1,149	3,358	22,814	24,155
Rails and splice bars	838	394	14,685	20,988
Structural shapes	532	2,607	7,949	11,648
Boiler and other plates	2	321	1,498	2,888
Sheets and saw plates	63	116	739	2,499
Bar iron	119	179	7,563	4,329
Tubular products	583	2,003	2,031	9,188
Castings and forgings	73	367	769	2,100
Nails and screws	132	31	481	419
Tinplate	425	30	6,042	756
Bolts, nuts, rivets and washers	19	22	104	130
Wire rods	133	170	2,422	4,080
Round iron and steel wire	514	308	1,786	2,546
Flat wire and strip steel	44	73	492	1,387
Wire rope and insulated wire, all kinds	150	64	362	712
Total	106,197	39,278	889,765	327,064
Manganese ore	12,799	46,067	243,669	199,238
Iron ore	166,626	231,343	1,443,320	1,900,920
Magnesite	13,923*	5,005	88,488	36,602

*Revised.

The rather abrupt decrease in foreign business for the American iron and steel industry is explained by the let-up in purchases of sizable quantities from Japan, which evidently is supplied for the present in some of the heavy lines to begin work of reconstruction. It is believed that Japan is especially well supplied with sheets and nails, and has a fair tonnage of steel rails on hand. At the same time it is thought that, while Japanese purchases may be temporarily halted, due to the slightly disturbed economic conditions in that country, it soon will be open again to good-sized purchases of more rails, pipe, and perhaps wire.

Machine Tool Exports

	March, 1924		February, 1924	
	Number	Value	Number	Value
Lathes	48	$70,937	49	$88,360
Boring and drilling machines	147	45,522	208	21,255
Planers, shapers and slotters	17	22,725	36	32,082
Bending and power presses	25	25,669	11	14,849
Gear cutters	62	65,653	16	20,887
Milling machines	37	29,930	31	35,021
Thread-cutting and screw machines	37	41,566	60	53,889
Punching and shearing machines	13	4,940	22	8,908
Power hammers	13	14,434	11	6,009
Rolling machines	17	11,944	8	53,092
Sharpening and grinding machines	562*	128,102*	270*	846,115*
Chucks, centering, lathe, drill and other metal-working tools	2,282	21,821	2,593	36,544
Pneumatic portable tools	768	60,766	1,136	66,593
Total	4,029	$544,409	4,451	$1,283,604

*Includes number of external and internal grinding machines only; "other sharpening and grinding machines" are now reported by weight instead of by number.

Exports of machinery in March were valued at $26,744,109, compared with $24,927,382 in February. Included in these figures were 4029 machine tools in March, with a value of $544,409, as against 4451, valued at $1,283,604, in February.

Imports of iron and steel in March of this year totaled 39,278 gross tons, valued at $1,848,110, as against 42,269 tons in February. Pig iron imports in March were 16,919 tons, a slight increase over February, when the total was 15,482 tons.

Imports of manganese ore were especially heavy in March, amounting to 46,067 tons. Similar imports in February aggregated only 4430 tons. Iron ore imports, amounting to 231,343 tons in March, also showed a marked increase over February, with a total of 115,039 tons.

Imports of Iron and Steel in Gross Tons

(Monthly Averages)

	Total Imports	Pig Iron	Ferro-alloys	Manganese Ore and Oxide*
1909 to 1913, incl.	26,505	†14,132	....	....
1914 to 1918, incl.	23,351	4,645	3,281	‡47,155
1919 to 1921, incl.	23,901	5,708	3,710	37,115
1922	59,545	31,954	9,117	31,204
January, 1923	120,078	83,935	5,120	829
February	67,704	35,793	9,234	4,636
March	106,197	72,344	9,030	12,799
April	77,903	36,371	7,221	14,071
May	75,883	39,764	10,482	12,734
June	68,019	30,033	12,794	36,138
Six months' average	85,964	49,706	8,980	13,535
July	53,464	19,760	12,381	23,824
August	45,439	14,564	7,334	23,026
September	36,611	8,353	9,744	35,175
October	29,882	9,349	9,372	16,842
November	26,364	9,299	5,073	14,790
December	27,009	12,355	2,307	12,003
Twelve months' average	61,217	30,652	8,343	17,171
January, 1924	26,675	10,587	3,033	23,081
February	42,269	15,482	4,847	4,430
March	39,278	16,919	3,941	46,067
Nine months' average	36,340	12,956	6,449	22,138

*Not included in "total imports."
†Included ferroalloys.
‡Average for three years, 1916 to 1918 only.

Monthly Exports, January, 1923, to March, 1924, Inclusive

(In Gross Tons)

	All Iron and Steel	Pig Iron	Semi-Finished Material
*Average, 1912 to 1914	2,406,218	221,582	145,720
*Average, 1915 to 1918	5,295,333	438,462	1,468,026
Calendar year 1919	4,239,837	309,682	258,907
Fiscal year 1920	4,212,732	248,126	288,766
Calendar year 1920	4,961,851	217,958	216,873
Fiscal year 1921	4,168,619	129,541	82,549
Calendar year 1921	2,213,042	28,305	10,363
Fiscal year 1922	1,721,418	28,330	63,127
Calendar year 1922	1,986,297	30,922	107,201
January, 1923	123,190	2,482	12,253
February	133,902	2,786	9,357
March	163,920	2,881	14,066
April	177,471	1,844	14,863
May	203,389	1,848	16,859
June	171,183	2,960	12,278
Fiscal year 1923	1,816,329	31,891	137,757
July	168,558	2,966	8,357
August	161,426	3,117	11,232
September	172,499	2,148	12,610
October	152,511	3,294	13,442
November	186,956	3,198	16,347
December	177,844	2,750	11,073
Calendar year 1923	1,992,595	32,318	152,748
January, 1924	247,942	3,812	8,594
February	164,820	4,773	11,463
March	123,618	4,047	2,278
Nine months	1,560,161	30,105	95,396

Machinery Exports from United States
(By Value)

	March, 1923	March, 1924	Nine Months Ended March, 1923	Nine Months Ended March, 1924
Locomotives	$631,220	$171,690	$4,635,473	$3,182,112
Other Steam Engines	60,690	42,584	1,486,382	846,900
Boilers	52,228	80,095	940,554	1,426,550
Accessories and Parts	62,017	214,778	800,534	3,179,255
Automobile Engines	646,276	528,900	2,975,199	3,331,128
Other Internal Combustion Engines	421,462	466,168	3,580,724	4,636,345
Accessories and Parts for	897,656	443,239	2,116,985	2,727,624
Electric Locomotives	492,878	33,622	2,291,112	1,397,714
Other Electric Machinery and Apparatus	249,843	1,492,944	1,690,974	6,940,025
Excavating Machinery	250,625	111,681	1,176,528	1,350,913
Concrete Mixers	25,129	47,496	390,203	422,673
Road Making Machinery	57,627	76,441	359,136	738,427
Elevators and Elevator Machinery	324,274	287,908	3,348,801	3,624,431
Mining and Quarrying Machinery	802,075	2,241,536	5,700,512	8,316,260
Oil Well Machinery	499,895	2,460,174	3,454,892	5,210,171
Pumps	661,370	602,215	4,924,827	5,849,512
Lathes	57,728	70,937	519,143	989,858
Boring and Drilling Machines	47,543	45,922	395,248	524,586
Planers, Shapers and Slotters	10,786	22,725	181,328	206,419
Bending and Power Presses	7,850	25,660	128,999	339,535
Gear Cutters	11,199	65,653	106,301	274,166
Milling Machines	32,774	29,930	354,251	330,412
Thread Cutting and Screw Machines	39,991	41,566	230,395	512,731
Punching and Shearing Machines	7,724	4,940	99,144	109,302
Power Hammers	24,791	14,434	113,828	137,130
Rolling Machines	4,038	11,944	144,009	102,092
Sharpening and Grinding Machines	101,072	128,102	682,592	874,217
Other Metal Working Machinery and Parts of	328,469	326,545	4,308,312	3,359,072
Textile Machinery	906,534	672,819	7,448,307	6,209,548
Sewing Machines	679,393	735,786	6,352,098	7,830,123
Shoe Machinery	127,369	81,965	894,889	907,699
Flour-Mill and Gristmill Machinery	76,553	56,874	832,103	906,707
Sugar-mill Machinery	114,238	257,864	3,171,534	5,869,218
Paper and Pulp Mill Machinery	394,390	129,675	1,496,463	1,480,409
Sawmill Machinery	74,713	34,162	456,821	470,314
Other Woodworking Machinery	101,191	111,364	1,134,883	958,510
Refrigerating and Ice Making Machinery	161,376	260,164	1,455,524	751,009
Air Compressors	354,523	315,221	1,884,526	2,191,960
Typewriters	1,172,123	1,286,714	9,027,420	10,569,766
Power Laundry Machinery	53,946	58,126	675,436	699,221
Typesetting Machines	486,014	272,410	2,786,037	3,064,379
Printing Presses	409,197	378,070	3,227,810	3,775,531
Agricultural Machinery and Implements	3,709,743	5,922,255	24,532,128	42,470,941
All Other Machinery and Parts	8,666,614	6,980,712	73,560,848	78,711,927
Total	$24,297,146	$26,744,109	$186,051,093	$232,443,167

Exports of Iron and Steel
(In Gross Tons)

	March 1923	March 1924	Nine Months Ended March 1923	Nine Months Ended March 1924
Pig iron	2,881	4,047	25,239	30,105
Ferromanganese	1,000	1	1,430	2,087
Ferrosilicon	242	157	754	866
Scrap	4,166	8,392	27,322	72,079
Ingots, blooms, billets, sheet bar, skelp	11,416	1,386	79,654	62,465
Wire rods	2,650	892	14,103	32,931
Iron bars*	....	317	....	5,189
Steel bars	15,468	9,531	119,534	102,198
Alloy steel bars	212	591	2,108	2,268
Plates, iron and steel	11,891	7,251	72,691	72,533
Sheets, galvanizer	12,372	7,027	75,601	72,883
Sheets, black steel	8,423	6,263	68,672	147,457
Sheets, black iron	755	579	7,509	8,664
Hoops, bands, strip steel	3,093	4,585	26,622	28,672
Tin plate, terne plate, etc.	7,028	12,902	49,749	132,387
Structural shapes, plain material	12,487	8,782	78,196	77,394
Structural material, fabricated	4,894	8,017	66,010	65,203
Steel rails	24,283	7,402	173,136	217,613
Rail fastenings, switches, frogs, etc.	2,767	2,123	27,187	33,508
Boiler tubes, welded pipes and fittings	13,287	13,939	119,554	162,580
Cast iron pipe and fittings	2,784	2,152	38,069	21,791
Plain wire	6,708	3,669	61,347	58,662
Barbed wire and woven wire fencing	6,751	7,191	58,747	52,130
Wire cloth and screening	84	112	1,267	1,632
Wire rope	488	260	4,186	3,582
Wire nails	2,050	1,494	22,053	43,823
All other nails and tacks	939	691	5,794	5,885
Horseshoes	26	33	840	754
Bolts, nuts, rivets and washers, except track	1,542	1,414	13,699	13,345
Car wheels and axles	1,630	1,027	12,437	15,789
Iron castings	1,153	663	7,793	7,433
Steel castings	234	560	1,385	4,411
Forgings	216	167	1,598	1,841
Total	163,920	123,618	1,264,286	1,560,161

*Separately reported since January 1, 1923.

Imports of Machinery
(By Value)

	March 1923	March 1924	Nine Months Ended March 1923	Nine Months Ended March 1924
Metal-working machine tools	$93,582	$26,527	$285,526	$294,001
Agricultural machinery and implements	214,651	179,842	1,745,741	1,750,411
Electrical machinery and apparatus	25,559	33,810	*142,721	305,890
Other power generating machinery	361,945	.....	*1,529,783	480,326
Other machinery	190,314	308,519	1,803,801	2,555,199
Vehicles except agricultural	278,710	183,003	1,392,995	1,778,801
Total	$1,164,761	$731,701	$6,900,567	$7,164,628

*Beginning Sept. 22, 1922.

Exports by Countries of Destination
(In Gross Tons)

	March 1923	March 1924	Nine Months Ended March 1923	Nine Months Ended March 1924
Plates:				
Canada	11,099	6,699	54,475	54,750
South America	158	86	770	800
Japan	19	....	1,484	911
Cuba	36	32	574	512
Philippine Islands	8	20	590	538
Mexico	113	46	902	570
Galvanized Sheets:				
Canada	2,976	2,426	21,462	93,387
Cuba	1,273	627	5,377	7,235
Chile	508	191	2,270	1,794
Argentina	446	556	3,913	4,553
Philippine Islands	767	1,372	8,930	7,915
Central America	....	226	....	2,861
Japan	....	29	....	13,400
Mexico	446	218	3,913	3,827
Colombia	731	252	3,444	2,019
Black Steel Sheets:				
Japan	1,735	595	20,349	108,462
Canada	5,650	5,026	38,864	29,012
Argentina	....	156	....	928
Cuba	....	68	....	1,214
Philippine Islands	....	6	....	335
Tin Plate				
Canada	1,880	2,470	14,668	22,196
Japan	2,153	729	14,405	40,942
Argentina	....	259	....	9,589
Uruguay	....	3	....	2,135
China	....	3,370	....	20,665
British India	....	....	....	10,504
Chile	....	763	....	2,603
Cuba	496	637	1,888	3,927
Mexico	....	389	....	2,372
Hong Kong	....	809	....	5,553
Italy	580	568	1,094	1,726
Barbed Wire:				
Cuba	....	971	....	6,447
Argentina	1,291	1,287	9,199	6,832
Australia	866	261	6,875	3,168
Mexico	....	80	....	2,754
British South Africa	447	197	3,752	3,236
Colombia	460	607	4,513	3,229
Brazil	795	1,815	10,897	10,914
Canada	753	112	3,349	2,073
Steel Rails:				
Canada	7,464	303	19,389	44,214
Japan	8,545	343	67,324	79,299
Cuba	2,144	1,783	27,343	31,401
Chile	2,116	59	5,122	9,221
Brazil	....	252	2,311	5,574
Philippine Islands	514	608	5,702	4,040
Galvanized Wire:				
Japan	1,411	41	4,698	15,828
Argentina	889	511	13,420	6,813
Canada	1,050	1,345	10,500	11,244
Australia	978	123	8,615	3,474
Brazil	....	132	....	7,048
Mexico	....	302	....	2,626
Cuba	....	228	....	1,788
United Kingdom	....	137	....	1,977
Chile	....	70	....	1,437
Steel Rails:				
Chosen	....	....	10,726	1,178
Honduras	609	1,407	6,606	3,969
Kwan Tung	....	351	....	12,945
Mexico	21	799	4,645	6,227
Colombia	185	518	8,383	2,868
Argentina	....	....	1,179	763

Sources of American Imports of Iron Ore
(In Gross Tons)

	March 1923	March 1924	Nine Months Ended March 1923	Nine Months Ended March 1924
Spain	21,471	6,671	72,152	104,736
Sweden	41,535	48,137	368,868	416,465
Canada	31	348	2,041	11,717
Cuba	52,000	46,000	477,788	456,342
French Africa	11,300	.....	140,171	247,868
Other countries	40,289	130,187	382,270	663,792
Totals	166,626	231,343	1,443,320	1,900,920

Metal Trades Anniversary Celebration

(*Continued from page* 1279)

for their families, thus contributing largely toward the fitness of the men for their work."

Commissioner Sayre's Report

Homer D. Sayre, commissioner of the association, in his annual report first called attention to a questionnaire sent to members in January in a survey of the metalworking industry to determine business and employment conditions. While the answers to this questionnaire were largely compiled in February, at a time when industry was more busily engaged than is the case today, they provide an interesting sidelight on the industrial situation as it then existed. Questioned as to the business outlook for the first six months of the year, 278 companies, out of 682 replying, reported the outlook as "fair," 285 described it as "good," 75 as "very good," 19 as "poor," and 8 as "very poor." In man-hours per week, 366 companies reported increases, 251 reported decreases and 42 no change. In the number of employees, 399 reported increases, 42 reporting no change, while 168 reported decreases of less than 25 per cent, 51 reported decreases of less than 50 per cent and only 10 stated that their decreases had been greater than 50 per cent. Average hourly earnings of employees in February had shown an increase at the plants of 524 companies; 83 reporting no change. Thirty-five companies reported decreases of less than 8 per cent and 9 reported decreases of less than 16 per cent. Questioned as to wage systems employed, 310 reported paying employees on a flat hourly rate; 328 use a combination rate (piece, premium, bonus and hourly rate), while 17 pay on a straight piece work basis, 16 on a straight premium basis and 6 pay a straight bonus.

Labor Conditions

Commissioner Sayre reported on current labor conditions as follows:

"The United States Bureau of Labor Statistics reports 1819 strikes in eight major industries for 1921, 732 for 1922, and 825 from Jan. 1 to Sept. 30, 1923. Of this number there were 192 strikes in the metal trades industry in 1921, 81 in 1922, and 86 for the nine months ending Sept. 30, 1923, a total of 359. For these three years, your association was called upon to handle only six strikes, two each year. When we stop to consider the size of our membership, the percentage of strikes which has taken place in the shops of our members during this period is practically negligible. As has been frequently pointed out, the value of the service which the National Metal Trades Association renders its members lies to a great extent in its ability to prevent vexatious labor disturbances. We feel this is even more important than the ability to combat strikes after they have occurred, and the effectiveness of the former is being more and more reflected in the increasingly small number of strikes occurring in the plants of members.

Membership of Unions

"During this period, the American Federation of Labor and the International Association of Machinists, the chief union with which we come in contact, have not fared so well. The total paid up membership of the American Federation of Labor, as reported at its last annual convention, is 2,926,468, a decrease of 28 per cent from the 1920 peak of 4,078,740. In view of the increased activity in most lines of industry during the year 1923, this decrease in union membership is very significant.

"The average membership of the International Association of Machinists for the year 1922 was approximately 150,000. Last fall the membership reported at the Portland convention of the American Federation of Labor, showed it to be 97,000, which included only paid up members. The membership of this organization reached its height in the spring of 1920, when it reported a total of 312,000 members. On Jan. 1, 1921, its financial condition was very stable. The organization then had approximately $1,816,365. Today it is apparently in the most extreme financial straits. The cash balance reported on hand, as of Jan. 1, was $20,400.38.

"In view of its present numerical and financial condition, it is natural that its national officers are in the midst of a very intensive nationwide organization campaign to repair its dilapidated condition. These campaigns, for the most part, are being waged with the utmost secrecy lest the efforts become known before the campaign has gained sufficient strength to assure success."

Secretary Fischer's Report

L. W. Fischer, secretary, gave a detailed report of the association's activities, particularly referring to safety engineering work, industrial training, research and statistical work and the development of the association's publication, "The Open Shop Review." He also called attention to the proposed amendment to the Constitution of the United States, now pending in Congress, which, if passed, will authorize Congress to regulate the employment of every person under the age of 18 years. This amendment, Mr. Fischer pointed out, virtually empowers Congress to prohibit farmers' boys and others working on the farm during vacation periods, or city school boys from selling newspapers, or even college students under 18 from working in the morning or evening or in vacation time to pay their way.

Harold C. Smith, chairman of the committee on industrial education, reported that 68 per cent of the members of the association are now giving training to one or more apprentices.

The committee on membership reported that 97 new members had been admitted since March 1, 1923, and that 11 additional applications were still to be passed upon. The net gain in members during the year was 39, the total membership now being 1105. Three new local branches have recently been started.

Addresses of Past Presidents

As an anniversary feature of the program four past presidents of the association reviewed its growth during the 25 years of its existence. H. N. Covell, Lidgerwood Mfg. Co., Brooklyn, president in 1903-4-5, told of the early struggles of the organization. He was followed by F. K. Copeland, Sullivan Machinery Co., Chicago, who was president from 1908 to 1910. Mr. Copeland branched off into a discussion of present-day problems in industry, particularly those relating to the better understanding between employer and employee. He said that while manufacturers were discussing the need of education for employees they should also give heed to the fact that they need educating themselves. Many manufacturers, Mr. Copeland said, are too smug and self-satisfied and often not open-minded in their attitude on progressive developments. He cited as an instance of this the attitude which most manufacturers took on employees' compensation laws. "We were not leaders in a perfectly reasonable movement," said Mr. Copeland, "but when we did wake up to our responsibilities we started a good work in accident prevention."

Establishing Closer Relations

Mr. Copeland explained the methods used in his own plant, that of the Sullivan Machinery Co., in establishing closer relations with the workers. "We believe in getting our men together at least three or four times a year," said Mr. Copeland, "to discuss with them frankly the state of business and other matters which affect them as well as the company. We hold these meetings on the company's time and we consider it a good investment. If wages are to go up or come down, we tell them by word of mouth the reasons therefor. Men like to see the head of the concern once in a while and like to hear him talk about the business. In these talks we encourage our men to bring their troubles right to the head of the company and assure them they will not be criticized for doing so." Mr. Copeland said that frank talks of this kind with the men change their spirit toward their employers and toward their jobs. He said that many employers spend too much time in problems connected with financing, engineering and sales and too little to labor relations. He stressed the importance of training of foremen, making them leaders and not

drivers; also of the advisability of encouraging employees to become stockholders. Too little attention is often paid, he said, to sanitary and health features of a plant, such as light, air, cleanliness and toilet facilities.

Henry D. Sharpe, Brown & Sharpe Mfg. Co., Providence, R. I., who was president in 1912 and 1913, and Herbert H. Rice, Cadillac Motor Car Co., Detroit, president from 1914 to 1916, also discussed various phases of the association's activities during the years when they were most closely in touch with its development.

Industrial Training

A symposium on "Industrial Training from a Practical Viewpoint" occupied a portion of the Wednesday afternoon program. John C. Spence, works manager of the Norton Co., Worcester, Mass., introduced the subject with an interesting paper, in part as follows:

"Our failure to train men in this industry has been based on the conclusion that we could not afford to do so. It would now appear that we cannot afford not to do so. Most of us were long ago convinced that it is good business to have life insurance, income insurances and trusts for the protection of our heirs. Those of you who own interests in industrial establishments naturally aim to preserve them in sound condition for your heirs and assigns. It is good to organize for accurate cost keeping, fine selling methods, good banking connections and all the rest of those functions necessary for the financial conduct of a business, but don't neglect the base of the pyramid on which the remainder of the structure rests, and that is a body of sane-minded, well-trained mechanics out in the shop where, in the last analysis, the money is produced. You will have to do it eventually, why not now?

"Desirable boys and young men have not been voluntarily seeking apprenticeship in our industry for several reasons. Perhaps first among those reasons has been the rate of wages. Your educational committee has given to you a definite apprenticeship program outlining not only a recommended course of training, but also a recommendation for minimum wages.

Dislike for "Jobs"

"A second and very important competitor with us for the boys' services has been the apparent growing dislike in America for the so-called 'job' and the growing popularity for a means of earning a living that might be dignified by the name of 'position.' The boys who, by inheritance, should have the ability to carry on the work of the pioneer mechanics of this country have been gradually drifting into the so-called 'white collar' jobs. The modern reorganization of industrial methods has aided and abetted in this transition. In 1920 our population was double that of 1880. The workers in mines, railroads and manufacturing industries were three times as many and yet the clerks in these three industries, even omitting all of those engaged in direct sales effort, were 17 times as many. This expansion of clerical work by a factor of nearly 6 to 1 has naturally had a very serious effect on the numbers of youths available for mechanical work.

"There is now setting in a tendency toward the filling of our shops with people descended from Southern and Eastern Europe and Asia. These peoples in the past have not compared with the Northern races from the standpoint of mechanical genius. It is only fair to assume that in this, as in all other human traits, like peoples will produce like results. Therefore, unless this and other associations take definite steps to avert it, we will be definitely on the road toward becoming a nation of copyists and will have lost that genius for doing things by machinery that has actually made this nation what it is today, the greatest nation in the world!

"Your committee on industrial education has worked faithfully for six years. We believe that most of our members today are with this committee and its objects in spirit at least, and that if conditions of business would warrant it, the great majority of our members would start with this training plan. This committee realizes that it came into this work at a time when the gospel of training and preparedness was accepted by nearly everybody and therefore that its work for this reason was made easier. The committee also wishes to acknowledge the pioneer work done by former committees of this association and of other allied associations, notably that of the National Machine Tool Builders Association."

Success in Education at York, Pa.

Thomas Shipley, York Mfg. Co., York, Pa., told of the success achieved in his city by cooperation between manufacturers and the public school authorities in developing an educational plan for training mechanical workers. Mr. Shipley said he became interested in industrial training a good many years ago through hearing discussions of the subject at meetings of the National Metal Trades Association, and after investigating the plan in effect for years at Fitchburg, Mass., called a meeting of York manufacturers to consider the advisability of recommending a similar plan to the school authorities of York. The York school board fell in with the suggestion and a committee, consisting of manufacturers and school heads, went to Fitchburg to study its educational plan. With slight modifications, this system was adopted for the York schools and has now been in effect for 13 years. Both manufacturers and school authorities are well satisfied with the results, he said. His own satisfaction was expressed by the fact that he put his own son through this course of education and shop training before sending him to college, and he recommended to all manufacturers who have sons that they wish to have enter their business to give them a similar sort of combined shop and school education before sending them to college.

The York plan of education consists of a four-year high school course. In the freshman year, only one hour each day is devoted to a trade, but in the last two years of the course the time of students is equally divided between shop and school, two weeks in school and two weeks in a shop being given in alternation. Of the 770 boys who have enrolled for this course since the plan was inaugurated, 322 have been graduated, of whom 210 remained at work in York plants. Twenty-six have followed up their training with college courses.

George P. Aborn, Worthington Pump & Machinery Corporation, Blake & Knowles works, East Cambridge, Mass., told of the methods employed in that plant to educate apprentices. He said that the numerous trade schools of Boston and vicinity afforded an opportunity for every boy to take a course in the particular kind of work he desired to learn, and the Worthington company works out a plan whereby the boy may take so many hours per week of practical training in connection with such school work.

The Plight of the Farmer

The plight of the farmer was clearly explained by L. J. Taber, master of the National Grange, who began his talk by emphasizing the economic importance of the farmer to manufacturers and to transportation. He said that the farmer ships two-fifths of the nation's freight in normal times, that he buys 42 per cent of the manufactured goods sold in this country and that he owns four-fifths of the total ground area of the country. He said that the deflation which has hit the farmer since the war has been through no fault of his own. This deflation has taken all of the farmer's war profits, leaving him in a position where he has been stripped largely of his buying power.

Mr. Taber explained the discrepancy existing between the prices the farmer gets and the prices he is obliged to pay today by saying that the profit which a farmer's wife would make from tending to 100 hens for 30 days would just pay the wages of a plasterer for one day. The profit from 20 hours of labor in a wheat field would just about pay for one hour's labor by a mechanic in the building trades.

"Industry and labor," said Mr. Taber, "are enjoying an artificial value, while the farmer's products are down to a real value."

Mr. Taber said that the farmer's troubles are economic and not political and cannot be cured by legislation, but that legislation may be necessary as a tem-

porary measure to relieve the farmer from the unfair position in which he has been placed. Mr. Taber said that many of those who had criticized the passing of legislation to aid the farmer were those who had themselves received the greatest benefits from legislation in their interests. He mentioned specifically the protection given to manufacturers by high tariff legislation and the aid given to labor by restriction of immigration.

In concluding Mr. Taber made this observation: "We cannot long maintain an economic condition whereby we have short hours and high wages in industry and long hours and low wages in agriculture."

Conditions in Russia

Count Ilya Tolstoy told of present-day conditions in Russia, explaining in advance that there is no subject on which so much misinformation has been published. He said that the observations of American travelers returning from Russia were practically worthless, as under the Bolshevist régime no one in Russia dared to express to a stranger his real opinion of the Bolshevist Government. He cited a humorous example of mistaken views of American travelers, mentioning an interview with a certain traveler who, upon returning to the United States, commented on the interest which boys in Russia showed in newspaper reading because of the fact that they swarmed at the trains when they stopped at stations, begging for copies of newspapers. Count Tolstoy explained that the boys did not want these papers to read but to use in making cigarettes.

The Bolshevist Government is doomed to failure, in the opinion of Count Tolstoy. It is now dying, he said, but its final passing from power is an event which cannot be foretold exactly. It may live a year, he said, or it may live for several years, or its complete downfall may come at any time. He told of the complete industrial demoralization which has followed its efforts to establish communism. The Russian peasant farmer is today bearing the heaviest burden of taxation. He cannot pay in money, so he pays in kind, and the farm products he thus contributes to the Government go to support the people who are living in the cities. Meanwhile, the farmer no longer attempts to buy manufactured goods because of their high prices, and he has gone back to the primitive methods of living of 50 or 100 years ago. He even makes his own clothes and his own furniture.

Partial Return to Private Owners

The partial return to capitalism by the Bolshevist Government has ameliorated conditions in Russia to some extent, Count Tolstoy said, but there will not be a complete recovery until the Bolsheviki are out of power. Most or all of the minor industries have been allowed to go back into the hands of private owners, but the major industries are still government controlled. Foreign trade has been allowed to pass into the hands of private interests, resulting in the greatest orgy of speculating any country has ever had. This is especially true in Moscow, where the entire population is engaged in speculating. There are markets on every street, selling all kinds of goods, prices mounting day by day as the goods are sold over and over again. Moscow, once a city of darkness and stagnation, has again revived outwardly. Its street cars are running, there are electric lights, shops and theaters and restaurants are open for business, and the people bear the outward evidences of prosperity. Wealthy speculators are riding in Rolls-Royce automobiles, that are bearing women wearing expensive apparel imported from Paris, and money is spent freely. The worthlessness of the paper money has caused people to get rid of it as quickly as possible and there has arisen an orgy of spending similar to that which existed in Germany during the height of its paper money "spree."

Count Tolstoy concluded by saying that he would consider it a great mistake for the United States to recognize the present Russian Government. It is not even a Russian Government, he said, as the men wielding the power are one Russian, one Jew, one Georgian and one Pole. The majority of the Russian people are not in favor of the present government but are afraid to say so.

"The Physician in Industry" was the subject of a symposium led by Dr. John J. Moorhead, professor of surgery, New York Post Graduate Medical School and Hospital, New York. Dr. Moorhead has been closely associated with the work done in industrial medicine and surgery by the National Conference Board. His argument for systematic examination and medical care of workmen was that, aside from its philanthropic side, it is a good investment for the plant management, as it will greatly reduce labor turnover and productive efficiency. He estimated that the cost per year of putting in an efficient medical department in plant is $4.43 per year per man.

Dr. Moorhead was followed by Dr. W. I. Clark, who is in charge of the medical department of the Norton Co., Worcester, Mass. He said that the physical examination is the basis for all satisfactory medical work in industry. Taking care of accident cases, prevention of infections in wounds, giving special care to sanitary and hygienic features of the plant and the prevention of minor illnesses becoming major illnesses are some of the things the medical department will do, thereby keeping men at their jobs and lessening the loss to the employer from absenteeism and reduced efficiency.

Dr. O. P. Geier, Cincinnati Milling Machine Co., Cincinnati, said that medical inspection and care of workers has proved a really profitable investment for that company. Statistics have shown that only 45 per cent of the workers in the average plant have had their teeth examined, while only a small percentage have had a complete physical examination.

Production pays the bill when men are sick, said Dr. Geier. In the influenza epidemic of 1919 some plants in Cincinnati had fully 30 per cent of their force away; some which had the advantage of medical service kept their absentees down to 5 to 7 per cent of the whole working force. The money saved in these two months, said Dr. Geier, paid the cost of medical service for a whole year. He said that every plant should have a slogan, "Work Here and Live Longer" and live up to that slogan.

Another advantage of medical service in a plant, as pointed out by Dr. Geier, is in the problem of personnel work. The physician gets close to his patients, finds out what they are thinking about and is an excellent man to cement better relationships between employer and employee.

Dr. Geier cited an instance of a factory which, after starting a medical department and employing a good physician, reduced its absenteeism from 7 to 3 per cent. The physical examinations of workers disclosed that there were 28 cases of active tuberculosis and these men and women were advised of their condition and sent away to recover their health.

The Annual Dinner

At the annual dinner Wednesday night, President Coleman presided, and the only speaker was S. K. Ratcliffe, London, who spoke on "The New Order in England—MacDonald and His Government."

Mr. Coleman spoke briefly of the history of the association and then presented Mr. Ratcliffe as an eminent journalist whose writings for the Manchester *Guardian* and other great newspapers of England had given him high rank. He said that Mr. Ratcliffe was personally acquainted with Premier MacDonald and other members of the Labor Party Government, and was well equipped to tell about conditions as they existed in the British Empire today.

Mr. Ratcliffe reviewed at length the history leading up to the coming into power of the labor party and told of the methods adopted by the new Premier in forming his Government and in determining policies. He spoke in an entirely impartial manner and gave Premier MacDonald credit for being a leader of great courage, rare personal charm, and unquestioned integrity. He said that some serious difficulties had already been avoided, and that he saw nothing in immediate prospect that threatens to result in a vote of confidence to compel the labor party to retire from power. He said that no attempt is being made to put into effect radical policies long advocated by some of the labor leaders.

Electrochemists Discuss Developments

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baths for the refining of tin on a commercial scale. The advantages, disadvantages and special applications are pointed out with the exemplification of the reasons for the satisfactory stannous sulphate, sodium sulphate, sulphuric acid electrolyte. "Electrolytic Refining of Tin," by J. R. Stack, superintendent of tin operations, Perth Amboy plant, American Smelting & Refining Co., Perth Amboy, N. J., discusses the process as carried out on a large commercial scale by the company with which the author is connected, and states that the only practical solution of the problem of separating from tin such impurities as antimony, arsenic, lead and bismuth lies in electrolysis. The various electrolytes tried out commercially are discussed. The author states that over 35,000 tons of the metal had been refined into high-purity electrolytic tin. Another paper entitled "Addition Agents in Tin Refining Electrolytes," by Edward F. Kern and Edward A. Capillon, electrometallurgical laboratory, School of Mines, Columbia University, discussed the effect of these various agents on the cathode deposit of tin.

Commercial Electrolytic Iron

An interesting paper on "Electrolytic Iron" was presented by Donald Belcher, chemical engineer Milford Electrolytic Iron Co., Milford, Conn., entitled "Progress in Electrolytic Iron." The author discussed developments in this industry during the last 75 years and described the two plants now in commercial operation. There was also account of the development work on the Milford process for the hydrometallurgy of iron ores. The author traced the progress of this company in attempting to produce finished tubes and sheets directly from the ore and stated that the process is not technically and commercially complete as yet. He then discussed the future of electrolytic iron and stated that the tube field seems to be the most promising. He said that charcoal iron boiler tubes cannot be made seamless and it would appear that thin, uniform tubes of very pure electrolytic iron could be introduced. Tests have shown that electrolytic iron, properly treated, has the necessary mechanical strength.

Fused Quartz

At the opening of this session a paper not on the program or preprinted was presented by E. R. Berry on "Fused Quartz." Some remarkable samples of Mr. Berry's work were exhibited and it appears that he has succeeded in developing an electric furnace in which fused quartz of the highest purity and homogeneity can be produced on a commercial scale. Mr. Berry stated that nowhere else in the world was it possible to see such samples as he had with him and he believed that the future of this particular development was bright.

New officers for the electrodeposition division of the society were elected at this meeting with Dr. O. P. Watts, associate professor of chemical engineering, University of Wisconsin, Madison, Wis., as chairman; Dr. Paul D. Merica, International Nickel Co., New York, as vice-chairman; and William Blum, Bureau of Standards, Washington, as secretary and treasurer, with O. C. Ralston and H. S. Lukens as directors.

Refractories for Electric Furnaces

Because of the unusual success which attended the first round table luncheon discussion held by this society at Dayton, Ohio, last September, on electric brass furnaces, the directors planned a similar discussion for the meeting this year, taking as the subject, "Refractories for Electric Furnaces." There was some conjecture as to whether there really were any problems in this particular branch of the industry and some doubt as to whether such a discussion would be successful. The promoters, however, were more than surprised at the response. Plans had been made for an attendance of about 50, but when those interested gathered around the tables, the registration was nearer 150. The result was that this comparatively new type of meeting has been demonstrated a complete success.

The session was under the direction of Dr. M. L. Hartmann, director of the research laboratory, Carborundum Co., Niagara Falls, N. Y., who presided and who organized the meeting. Representatives of makers and users of refractories and of sellers and users of electric furnaces were present who, together with others interested, gathered around several tables, and for each table a captain was appointed to whom was assigned a particular question for discussion. After the luncheon, each captain was called upon to report the result of the informal table discussion.

Discussion Opened by Dr. Stansfield

The general meeting was opened by Dr. Alfred Stansfield, professor of metallurgy, McGill University, Montreal, who presented a general review of the conditions confronting the industry today. Characterizing the subject as very important Dr. Stansfield said that there were three types of electric furnaces, the independent arc, as represented by the Rennerfelt or Stassano furnaces; second, the direct heating arc, such as the Heroult type; and third, the induction furnaces. He dealt largely with the second of these, or the direct arc furnace.

Citing the fact that the roofs of such furnaces are largely of silica brick, which have various melting or disintegrating temperatures varying from 1600 to 1700 deg. C., more often the latter, and also the fact that low-carbon steel has a melting point of not less than 1500 deg. C., he said that this means a working range of not much more than 100 deg. C. between the bath and the roof, a condition not at all favorable.

In the speaker's opinion the industry was skating on rather thin ice under such conditions and he wondered, for the sake of discussion, whether some other material might not be possible for the roof; he used as analogies the metallurgical practice in some other industries. In certain copper furnaces an iron plate, water-cooled, is used for the roof, and in reverberatory furnaces there are certain conditions which possibly might be imitated. He also suggested the possibility of cooling the roof by air or water when using some permanent refractory. As to the possibility of using some other material than silica, he wondered whether some of those high in alumina might not be developed.

Dr. Otto Frick of Sweden

Dr. Otto Frick, of Sweden, the inventor of the Frick induction furnace, was present, and he stated that the roof problem in his furnace was considerably different from that in other furnaces, although the hearth problem was about the same. It has been his experience that pure magnesite is very successful as a bottom for such furnaces, if finely ground magnesite is used as a binding material. Such linings had lasted from three to three and one-half months, and he explained this on the assumption that the grinding of the magnesite tended to break down the crystals, with the result that a better lining was made possible. It was Dr. Frick's opinion that the refractory problems were more severe in the small furnaces such as the three- or perhaps the fifteen-ton, and he made the rather startling statement that he expected eventually the 100-ton furnace to become quite common in which the shallow bath and the absence of steep walls would simplify the refractory problem. As to roofs, Dr. Frick was hopeful that one of magnesite could satisfactorily be made and he knew of cases where this had been accomplished and where the roofs had withstood many heats.

Misuse of Refractories

After these two addresses the chairman called upon the captains of some of the different tables to make their reports. The captain of the table to which was assigned the question, "How much trouble is due to unsatisfactory refractories and how much to the poor use of the same?" was Charles J. Crawford, New York, who stated that the steel and other industries using high temperatures are at a standstill because of refractories. The refractory business embraces more problems than it is usually supposed to em-

brace, such as geology, mineralogy, chemistry, etc. The effect of temperatures, fluxing, catalytic action, structural design, etc., is involved. No one brick can meet all conditions satisfactorily but, in his opinion, most of the problems can be solved. The fact is that much of the material which is made is unsuited to the use to which it is put and the tendency is to blame the refractory man, whereas if there were more cooperation better results could be obtained.

F. A. Harvey, Mt. Union Refractories Co., Mt. Union, Pa., testified that many refractories are misused and that there is not enough cooperation from the consumer. He admitted that refractories are far short of meeting present problems, but he was sure that these will be met in the near future.

C. A. Hansen, General Electric Co., Schenectady, N. Y., stated that a large part of the cost in making electric steel castings, in his early experience, was due to the misuse of refractories. There was often improper laying in of brick and he pointed to the fact that stalactites from the silica roof of a Heroult furnace are no longer silica, but contain large quantities of lime, magnesia, etc., with the melting point as low as 1300 deg. C.

That the final cost per ton of steel was the controlling factor in the selection of refractories was the opinion of F. W. Brooke, Swindell Brothers, Pittsburgh, although he stated that in his experience the inadequate care of brick by the consumer was often at fault, citing cases where he had seen silica brick piled in a yard and covered with ice.

The question of the relative merit of fused magnesia and burnt magnesia for furnace linings was the subject at another table and the discussion developed the fact that while fused magnesia had the merit of less contraction, its higher cost of three or four times that of burnt magnesia was a decided detriment to its use. In the experience of Mr. Hansen, fused magnesia was by far the better and he had found that it could be obtained at a cost which was not prohibitive for certain conditions.

Dolomite for Bottoms

At another table, the question whether dolomite was a favorable material for the bottoms of electric furnaces was discussed by a few of those present and the interesting testimony was brought out that at one plant dolomite had been used as a substitute for magnesia for five years in electric furnaces and large numbers of heats had been made upon such bottoms. Another user cited the lower cost of dolomite and recommended its use, provided the material was not purchased far ahead of its actual placing in the furnace. He also stated that in his own experience many hundreds of heats had been made on dolomite bottoms in electric furnaces.

Another subject brought up for discussion was whether chromite brick are necessary in a basic furnace between the bottom lining and the side walls. The consensus of opinion on this subject was that wherever they had been used they were unnecessary and that in some cases the action of the bath was such that these brick had often been eaten out and chromium deposited in the steel.

The employment of materials low in heat conductivity was another subject briefly discussed and was recommended wherever they could be successfullly employed, and some cases were cited where this had been possible in the shells of some types of furnaces. Dr. B. D. Saklatwalla, Vanadium Corporation of America, described the water-cooled roof over ferrovanadium furnaces as being the only thing that would stand up under the high temperatures existing there.

As in Dayton, no stenographic report was taken and the reporting of the session was restricted.

New Officers

At the annual meeting, held Friday morning, new officers for the ensuing year were elected as follows:

President: H. C. Parmelee, editor *Chemical and Metallurgical Engineering*, New York.

Vice-Presidents: C. F. Burgess, Madison, Wis.; Dr. Carl Hering, Philadelphia; and F. A. J. Fitzgerald, Niagara Falls.

Managers: S. C. Lind, Bureau of Mines, Reno, Nev.; A. H. Hooker, Hooker Electrochemical Co., Niagara Falls; and Duncan MacRae, Westinghouse Research Building, East Pittsburgh, Pa.

Treasurer: F. A. Lidbury, Oldbury Electrochemical Co., Niagara Falls.

Secretary: Dr. Colin G. Fink, Columbia University, New York.

The new president, Dr. Parmelee, has been an active member of the society since 1912. He received his education in the University of Nebraska where he was graduated with the degree of B. Sc. in 1897, later receiving his A. M. degree from the same university in 1899. In his early career he was an assistant chemist for the Union Pacific Railroad and chief chemist of the Globe plant of the American Smelting & Refining Co. at Denver, Col. His first work as editor was in Denver in 1905 when he became a directing head of the *Mining Reporter*, which he edited for two years. For three years after this he was editor of the *Western Chemist and Metallurgist* and from 1910 to 1916 he was western editor of *Metallurgical and Chemical Engineering*, spending the next year as president of the Colorado School of Mines, which he left to assume his present position. He received the honorary degree of Doctor of Science from Colorado College in 1917.

Service Rendered by Technical Societies

The retiring president, A. T. Hinckley, National Carbon Co., Niagara Falls, N. Y., took as the subject of his annual address, "The Service Rendered by Technical Societies." Stating that the general public is served by technical societies in two ways: namely, through the broadening of the point of view of the members on technical subjects of public interest, and to a less extent through the furnishing of technical information to governmental agencies, Mr. Hinckley pointed to a recent statement of Secretary Hoover that "we are facing a time in the development of our civilization when we must find some sort of a bridge between the extreme individualism of the last century and the possible inroads of those forces that would extinguish that individualism entirely." Mr. Hinckley regarded this as the keynote of the situation and said that he believed that the bridge exists in ourselves and in our present institutions. In a broad way, "technical societies bring to science the point of view of industry; to the State, more interest and intelligent citizens, and to the individual those new contacts and new vistas which teach him to think."

Among some of the interesting reports presented at this meeting was that of the committee on dry cells, which stated that the American Electrochemical Society was the first one to publish papers on this subject, as early as 1908, and that today the industry is based upon the literature which this society brought out in the earlier days of the industry.

The financial condition of the society was reported as unusually favorable, there being a cash balance in the treasury of about $11,000, which contrasted with a deficit of something like $7,000 in 1920.

Future Meetings

The fall, or forty-sixth, meeting of the society is to be held in Detroit Oct. 2, 3 and 4, at the Hotel Tuller. Among the subjects for discussion at this meeting will be "Industrial Electric Heat," "Refractories for Electric Furnaces," " Electric Iron" and "Corrosion."

Upon invitation of the local section at Niagara Falls, the spring meeting of the society of 1925 will be held in that city.

With the aim of importing on a wholesale basis small tools of all kinds for shop equipment, a company known as Kyodo Kikai Hanbaisho has been formed with address at 28 Sanchome, Honzaimoku-cho, Kyobashiku, Tokio, Japan. The enterprise has been fostered by a group of leading machinery houses, and S. Noda, president Roku-Roku Shoten, Ltd., agent in Japan for the Barnes Drill Co., Rockford, Ill., is vice-president of the new company. H. Okuda, formerly associated with Horn & Co., will assume the managing directorship.

Production Controlled by Estimating Sales

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dividual business. However, it was realized that the business cycle action which might be revealed in the figures of any business would very likely not be revealed unless the seasonal variations were first eliminated. The presence of the seasonal variations might so complicate the appearance of the raw demand figures that it would be difficult to see any direct connection between the general variations of the particular business and the business cycle of the country as a whole.

In another part of Mr. Barber's paper it was stated as an axiom that business cycle studies are not effective in the profitable sense unless they may be "brought down to earth" in a tangible way, and that they are not effective unless such studies directly influence the quantities and time of initiating work orders into the shop in a suitable coordination with the quantity and time of sales orders to be received from the consumer.

The evident need for an analysis of the company's figures with a view to determining the causes of, in order to anticipate their effect upon, the variations the company's demand, was thus summarized. It was emphasized that financial estimates, as expressed in the budget could not be expected to approximate the actual conditions unless the incoming demand could first be accurately anticipated, and unless a definite purchasing and production schedule could be based thereon and the resulting financial adjustments calculated thereafter.

Establishing of Quotas Described

The earlier statistical methods, first utilized in establishing the 1923 sales quota, were then described by Mr. Barber at length, the several charts and forms used being shown by lantern slides and explained. The sales were discussed in dollars. A wealth of detail was offered in connection with the later and improved methods, which included anticipating real demand as expressed in order figures, and the application of these demand findings in establishing inventory and production control. The application of statistical analysis was shown to develop the possibility of estimating orders well in advance, that is, sufficiently early to determine a mature production and inventory program while there is yet time to control the factors governing production and inventory.

In concluding his paper Mr. Barber called attention to the statement of a writer who said recently that "there isn't a single business in the world to which the theory can be applied. The cycle theory (which is founded on the idea that when one thing happens in business something else may be expected to happen) is applicable only to the total of business conditions in general."

"Today, we too," said Mr. Barber, "would be indorsing this statement if the raw summary figures of the particular business were to be compared indiscriminately with general average cycle conditions of the total of all external business. But, on the other hand, we do commit ourselves to the proposition that there is a definite aid to control attainable through analysis of business cycles, if an industry will define its own cycle action, devoid of other than cycle variations—if, upon such a common ground of comparison, it will differentiate its own cycle of orders, for instance, from its own cycle of billings; and if it will compare the cycle of any one of its own factors with only the external cycle factors which are directly relevant to that one internal factor. Then, will the industrial administrator look behind the cautiously worded general forecasts for 'average business,' only to find that there is some 'rhyme and reason,' that there is some consistent 'cause and effect' relation between a defined group of external business conditions and the cycles, past and future, of his own business.

"There remains then but the definite application of his acquired knowledge, tempered by experienced judgment, to the adjustment and control of his practical everyday affairs. This final essential, in the long chain of requirements, is the test of value of all that goes before."

In discussing "will in work," Mr. Barber concluded with a statement of the company, which in part was as follows: "Budgetary control is now one of the fundamental policies of the Walworth company. It is our record of the past, our index for the present, and our guide to the future. We believe it to be an essential factor in our success."

Gear Manufacturers Association Opens Meeting at Buffalo

BUFFALO, April 28.—The meeting of the American Gear Manufacturers' Association, being held at the Lafayette Hotel, April 28 to 30, opened today.

In addition to reports of the association's officers, reports were made by several technical committees. The latter included the publicity committee, the general standardization committee, and the A. G. M. A. sectional committee of the American Engineering Standards Committee. Reports of subcommittees included the spur gear, herringbone gear, bevel and spiral bevel gear, and nomenclature committees.

A paper on "What Have I Left Out?" or the "Value of Cost Accounting to an Executive," by Russell C. Ball, treasurer Philadelphia Gear Works, Philadelphia, was received with interest. An abstract of this paper and its discussion will be given in a forthcoming issue.

New member companies were elected. These companies and their executive representatives were: Colorado Gear Mfg. Corporation, Denver, John A. Rankin; A. F. Oliver Gear & Machine Co., Buffalo, Arthur F. Oliver; Cloyes Gear Works, Cleveland, R. T. Cloyes; and the Foote Gear Works, Inc., Chicago, Bradford T. Foote. Joseph J. Brawn, Jr., Brawn Gear Corporation, Brooklyn, N. Y., was elected associate representative of his company.

George L. Markland, Jr., president Philadelphia Gear Works, Philadelphia, and president of the association, in his opening address urged interest of members in the present political situation with a view to help in the selection of legislators who would promote the passage of important measures affecting industry and the nation.

Mr. Fauntleroy Addresses Quad City Foundrymen's Association

R. R. Fauntleroy, president Moline Malleable Iron Co., St. Charles, Ill., addressed the Quad City Foundrymen's Association at the Davenport, Iowa, Chamber of Commerce, Monday, April 21. Mr. Fauntleroy outlined the substantial results obtained through the cooperative efforts of some of the leading malleable foundries in the direction of chemical research and shop practice analysis. These endeavors, he said, had resulted in making malleable cast iron in this country far superior to anything made in England or on the Continent. European malleable interests are now developing a similar research program copied from the one which has been followed in this country.

The next meeting of the association will be held at the LeClaire Hotel, East Moline, May 5, and the speaker of the evening will be H. M. Lane, who will give an illustrated lecture on European versus American foundry practice. Mr. Lane spent six months of last year in Europe studying foundry methods.

An attractive 28-page pamphlet with 24 narrow pages interleaved has been issued by the Tide Water Oil Sales Corporation, 11 Broadway, New York, from whom copies may be obtained. Under the title "An Unusual History of Petroleum," the story is traced from prehistoric times to the present in a series of episodes written in humorous vein, and showing the various uses which mankind has made of oil from the earliest days. Illustrated with cartoons in some profusion and printed in two colors, the pamphlet makes an unusual appearance.

Trade Changes

The Stanton-McLough Steel Co. has opened an office and warehouse at 2001 Vulcan Street, representing the Watson Brothers Steel Co., Youngstown, Ohio.

The Charles R. Bates Co., New York agent for the Rhode Island Tool Co., has moved to 54 Warren Street.

The Brooklyn Export & Steel Mfg. Co., formerly at 120 Liberty Street, New York, has moved to the First National Bank Building, Jersey City, N. J.

The Concourse Radio Corporation, New York, has been incorporated with $50,000 capital stock to manufacture radio equipment. Plans are indefinite as yet, but it is not likely that manufacturing will be undertaken. Present address is in care of Rumsey, Sheppard & Ingalls, 27 Cedar Street.

Controlling interest in the Luetkemeyer Co., hardware jobber, Cleveland, has been sold by E. H. Luetkemeyer to Henry L. Thompson and W. W. Knight, of Toledo, who hold the controlling interests in the W. Bingham Co., Cleveland, and the Bostwick Braun Co., Toledo, hardware jobbers, Mr. Thompson being president of both companies. Mr. Thompson will succeed Mr. Leutkemeyer as chairman of directors. It is announced that the Luetkemeyer Co. will continue in business with no change in its corporate name and that Harry Hutchison will continue as president of the company At a reorganization meeting, H. D. Cram, who is vice-president of the W. Bingham Co., was elected vice-president and treasurer and W. W. Knight, secretary.

Interests in the Federal Machinery Sales Co., 12 North Jefferson Street, Chicago, previously held by Charles T. Bush, Charles E. Allinger and Charles A. Strelinger, all of Detroit, have been relinquished and H. C. Barnes, secretary Wallace-Barnes Co., Bristol, Conn., an old machine tool builder, also well known as a spring manufacturer, becomes associated with the present active management of the organization. Charles A. Odegaard has been re-elected president of the company; Harry C. Barnes has been elected vice-president and Norton A. Booz, secretary-treasurer. Mr. Barnes will not take an active part in the management of the business. The former Detroit stockholders disposed of their holdings in order to concentrate their entire time and efforts to promoting the business of the Charles A. Strelinger Co.

On account of other interests in molding sand and other products, the Interstate Foundry Specialties Corporation, 248 Fulton Street, New York, will no longer represent the National Engineering Co., Chicago, manufacturer of Simpson sand mixers and other foundry equipment. G. C. Richards, Philadelphia, now represents the National Engineering Co. in that district.

The Federal Machinery Sales Co., 12 North Jefferson Street, Chicago, has been appointed exclusive representative in Chicago territory for the United States Drill Head Co., Cincinnati.

The Dale Machinery Co., Chicago, has been appointed exclusive representative in Chicago territory for the Willard Machine Tool Co., Cincinnati, manufacturer of engine lathes.

The stock of small tools and gages carried by the Pratt & Whitney Co. at its warehouse in 326 Hudson Street, New York, will be carried after May 1 in the Trinity Building, 111 Broadway, New York, thirteenth floor.

The Berger Mfg. Co., Canton, Ohio, subsidiary of the United Alloy Steel Corporation, has leased new warehouse quarters in Chicago at 3622 South Morgan Street. The company will occupy a two story building providing 50,000 sq. ft. of floor space. It has moved its warehouse from 20 North Market Street to its new quarters and will move the office May 1. The growth of its business in sheets and sheet metal products in Chicago made it necessary to secure larger quarters and at the same time a location affording track facilities in and out.

The A. M. Byers Co. has moved from 295 Broadway to Room 917, 110 East Forty-second Street, New York.

The New York office of the American Zinc, Lead & Smelting Co. has been moved to the Prudence Building, 331 Madison Avenue.

Strom ball bearings in the future will be manufactured by the Strom Ball Bearing Mfg. Co., successor to the U. S. Ball Bearings Mfg. Co., 4527-67 Palmer Street, Chicago. No change has been made in personnel.

The Wickman Screw Works, 420 Neptune Avenue, Pittsburgh, has changed its name to the Union Screw & Mfg. Co.

A. M. Jones, district manager of Buffalo Bolt Co., North Tonawanda, N. Y., has announced that hereafter the St. Louis district office at 1107 Chemical Building, will cover Texas, Arkansas, Louisiana, Tennessee, Mississippi and Alabama.

The Chicago office of the Max Ams Machine Co., 101 Park Avenue, New York, will be moved, effective May 1, to the Straus Building, 310 South Michigan Boulevard.

The American Steel Foundries, Chicago, has moved from the McCormick Building to the Wrigley Building, floors 15, 16 and 17, 410 North Michigan Boulevard.

The Dock & Terminal Engineering Co., 15 Park Row, New York, has acquired the engineering business formerly conducted by the Cleveland Dock Engineering Co.

The Wilson Welder & Metals Co., 132 King Street, New York, will move general offices and plant, effective May 1, to the Wilson Building, Hoboken Factory Terminal, Hoboken, N. J.

The McClintic-Marshall Co., 68 Devonshire Street, Boston, has moved to Rooms 914 and 915, same address.

The Federal Machinery Sales Co., 12 North Jefferson Street, Chicago, has been designated exclusive representative in the Chicago district for the entire line of the Garvin Machine Co., New York, with the exception of miling machines. The principal products for which it has the agency include hand screw machines, automatic tapping machines, duplex horizontal drills and special production machines.

The Russell, Burdsall & Ward Bolt & Nut Co. has moved its Chicago office to 1512-14-16 Straus Building, a structure which has just been completed.

The Kier Fire Brick Co. has moved general offices from 2244 Oliver Building, Pittsburgh, to larger quarters at 1842-48 of the same building.

The Domhoff & Joyce Co., pig iron and coke merchants, have moved the Cincinnati office from the Rawson Building, Fourth and Elm Streets, to the new Frederick A. Schmidt Building, Fifth and Main Streets, where the company will occupy suites 402 to 405.

The Huhn Mfg. Co. has moved into its new plant at 1391-93 Sedgwick Avenue, Bronx, New York, general offices and factory being combined.

The Reading Machine & Tool Co., has moved from 437 Washington Street, Reading, Pa., to the recently purchased property at 560 North Eleventh Street, that city.

The Cochrane Corporation is now the name of the H.S.B.W.-Cochrane Corporation. The initials of what was once known as the Harrison Safety Boiler Works are thus disappearing from the name of the company engaged in feed water heaters and other steam specialties manufactured by the Cochrane company.

The H. J. Ness Mfg. Co., 48 Howard Street, New York, manufacturer of the Nessweld electric spot welders, has made the following appointments as district sales representatives: W. P. Miltenberger, Boatmen's Bank Building, St. Louis; Raymond McCallum, 20 East Jackson Boulevard, Chicago, and Charles Opperman, 212 General Motors Building, Detroit.

Addison Clark & Brother, 319-21 West Pratt Street, Baltimore, dealers in iron and steel, also Baltimore and Washington agents for turned and ground shafting for the Cumberland Steel Co., Cumberland, Md., will move to larger quarters at 1101-11 South Howard Street about May 1.

The Shannon Mfg. Co., hardware manufacturer, and the Shannon Steel Sales Co., dealer in sheet and strip steel, have leased space at 3500 South Morgan Street, Chicago.

The Bolton Co., 261 Franklin Street, Boston, has been appointed New England representative by the Consolidated Tool Works, Inc., 296 Broadway, New York.

The Baltimore office of the Allen-Bradley Co. of Milwaukee, has been moved from 407 Munsey Building to 110 South Grant Street.

The Albert Pipe Supply Co., Berry Street and West Thirteenth, Brooklyn, has purchased all the pipe and machinery of the Eagle Pipe Supply Co., Long Island City. This supply will be liquidated at private sale.

The Commerce Iron Works, Baltimore, has acquired the property, formerly operated by the Calvert Iron Works, at 1907 Washington Boulevard, and will engage in the production of ornamental and structural iron and general machine shop work.

The Hollow Ball Co., Baltimore, has taken possession of about 5000 sq. ft. of floor space at 1510 Harford Avenue, for the production of a seamless hollow ball of brass for use in check valves, pumps, etc. C. K. Harrison is manager.

Plans of New Companies

The business of D. C. Elphinstone, 408 Continental Building, Baltimore, dealer in machinery, supplies, etc., has been incorporated with capital stock of $100,000 under the name of D. C. Elphinstone, Inc., Douglas C. Elphinstone, S. M. Christhilf, Arthur M. Kinsman, Maurice A. Long, Arthur E. Christhilf, James C. Shriver, George Vang and William C. Devecmon are the incorporators.

The Paramount Lamp Co., 22 West Nineteenth Street, New York, recently incorporated with $50,000 capital stock, will act as importer and distributer of electric lamps and kindred products. R. H. Shapera and L. A. Kasen are the incorporators.

The Tension Piston Ring Co., 189 Montague Street, Brooklyn, recently organized to manufacture piston rings, expects to have its product ready for the market by fall. Automatic machinery for producing this line is now being built by the Electrical Industries Mfg. Co., 326 West Forty-first Street, New York.

The DeMange Motors Corporation, Philadelphia, has been incorporated with $100,000 capital stock to manufacture motors. Plans for operation as yet are undecided. C. B. Lasell, 1600 Mt. Vernon Street, is secretary-treasurer.

The Garrison-Heiland Corporation, 107-9 West Thirteenth Street, New York, has been organized as a consolidation of the Garrison Brass & Machine Works, manufacturer of plumbing devices, tools and accessories, with Garrison-Heiland, distributers in this line. The businesses will be continued under the same principals, with George W. Heiland, as president; William J. Heiland, vice-president and treasurer, and Martin A. Brennan, secretary. The company is planning considerable expansion.

The Peerless Safety Device Co., Inc., 324 Leavenworth Street, San Francisco, has been organized to manufacture safety devices. Manufacturing will be done by contract, awards having been let. The company proposes to add hardware specialties to its line later. William A. Cherry is president.

The Hawkes Auto Equipment Co., Lansing, Mich., has been organized as jobber in automotive supplies.

The Rawlings Co. of America, Ltd., 1819 Broadway, New York, has been organized with $1,000,000 capital stock for the production of window lifts for automobile sedans. The lift also is adaptable to railroad trains. Manufacturing will be done by contract and awards have been made. J. H. Rowe heads the company.

The Chicago Sypho-Meter Mfg. Co., 64 West Randolph Street, Chicago, has been organized with $200,000 capital stock to manufacture metal specialties. Operations are now under way. R. A. Brooks is president and T. Dickens, treasurer.

The Van Buren Hardware Co., Van Buren, Ark., recently organized with $30,000 capital stock, has bought the Mansfield Hardware Co. of Van Buren and will continue the same line of wholesale and retail hardware. R. E. Peer is president.

The Syco Radio Products Corporation, 438-40 Drexel Building, Philadelphia, has been organized to manufacture radio products. E. K. Young is secretary-treasurer. Operations are under way.

The American Hardware Co., 14 East First Street, Oil City, Pa., has been organized with $25,000 capital stock to do a wholesale and retail business along radio and hardware lines. W. O. Banks is president and general manager.

The Federal Tank Co., Inc., Corsicana, Tex., has been organized for the purpose of buying fabricated steel tanks for sale and erection. Most of its material has been bought from the Columbian Steel Tank Co., Kansas City, Mo. A. W. Ashley is one of the heads.

The Tokheim Oil Tank & Pump Co., Fort Wayne, Ind., has been organized to manufacture electric traffic signals. Apparatus will be manufactured in the company's plant, where equipment is installed. Operations will begin within a week or two. R. F. Diserens is one of the heads.

The Burnley Machinery Co., 324 Liberty National Bank Building, Oklahoma City, Okla., has been organized to sell a complete line of power plant, water works, refrigeration and other lines of heavy machinery. It is now looking for a connection that will give a complete line of boilers, both horizontal return tubular and water tube boilers. E. G. Burnley is president and A. E. Kilkhurst, secretary-treasurer.

The Baltimore Retinning Co. has been formed in Baltimore with Arthur H. Benhoff, 2800 Elsinore Avenue, as president and general manager, to carry on a business of reconditioning, resoldering and retinning milk, dairy and ice cream cans, etc. A plant will be established at 148-52 North Gay Street and will be ready for operation about May 1. The company will use the process of the Calender Soldering Process Co., Chicago.

The Economy Grate & Equipment Co., 280 Madison Avenue, New York, recently incorporated with $300,000 capital stock, under Delaware laws, will manufacture grates for industrial and domestic use in burning the finer grades of coal. All work will be done by contract at Collegeville, Pa., and by the Abraham Cox Co., Philadelphia. Percy Litchfield is one of the principals.

The Kinodyne Radio Corporation, 522 Fifth Avenue, New York, recently incorporated with capital stock of $100,000, will act as international distributer of radio equipment and as consulting engineer in that line. The company has a large staff of experienced engineers and is in a position to represent several manufacturers. Although manufacturing is being considered, it will not be undertaken for some time. A. D. Buzby, who is connected with the New York office of the Wellman, Seaver, Morgan Co., is one of the heads.

The Dock Engine Co., Inc., care of J. W. Hill, 120 Broadway, New York, has been incorporated with $500,000 capital stock to manufacture internal combustion engines. Work previously has been done by contract.

George E. Valley & Brother, 486 Tenth Avenue, New York, has been incorporated with $50,000 capital stock to continue a business operating a general machine shop and repair works. Additional capital has been taken into the firm. The company is now operative.

George F. Lewis, Inc., 30 Warren Street, New York, incorporated with $125,000 capital stock, will act as jobber in hardware products.

The Yeller-Jack Mfg. Corporation, Brooklyn, has been incorporated with $50,000 capital stock to manufacture carbon removing equipment. A plant will be secured within a few months and equipment installed. Temporary address is in care of I. S. Greene, 44 Court Street.

A. N. Nelson, Inc., 41-43 Hamilton Street, Brooklyn, has been incorporated with $50,000 capital stock and will act as distributer of metal specialties. A. N. and C. M. Nelson, and E. F. Daly are the incorporators.

The Sattler Auto Accessory Co., 215 Montague Street, Brooklyn, recently incorporated with $50,000 capital stock, will manufacture in a small way a patented article in the automotive line. M. A. Shepard and P. E. Sattler are the principals.

The Consumers Battery Corporation, 152 West Forty-second Street, New York, recently organized to manufacture and sell storage batteries, has not made definite plans for operation. R. W. Berkowitz is secretary.

The Polymet Mfg. Corporation, 70-74 Lafayette Street, New York, has been organized with $30,000 capital stock to manufacture phonograph parts. For the present screw machine work will be handled under contract until the company's plant is equipped. This will be accomplished within the next few months. Production has been started on reproducers and will be extended to other lines shortly. N. C. Greene is one of the heads.

The General American Radio Mfg. Co., New York, has been incorporated with $500,000 capital stock to manufacture wireless equipment. Although plans are not completed, it is expected that a plant will be secured outside of New York and that operations will begin soon. Temporary address is in care of A. M. Grill, 34 Wall Street.

The Brooklyn Wire Chair Co., 84 Debolvoise Street, Brooklyn, has been incorporated with $50,000 capital stock and is now manufacturing wire furniture. M. B. Lieb is one of the principals.

The Martin Brass Works, Inc., 473 West Broadway, New York, incorporated with $25,000 capital stock has taken over the business of the F. M. Martin Brass Works.

Fluorspar Property to Be Sold

The Spar Mountain Mining Co. properties at Cave in Rock, Hardin Co., Ill., are to be sold under foreclosure proceedings by bondholders on May 6, at the county seat, Elizabethtown, Ill.

Spar Mountain has been a good producer since 1918 but heavy organization, legal and investment outlays impaired its financial position and brought about foreclosure by bondholders. An official of the company says:

"Several of the largest producing fluorspar mines in the southern Illinois section have been flooded recently, perhaps absolutely drowned out. This will result in temporary if not permanent reduction in output, which, coupled with increased demand, will most certainly result in an advance in prices. Ownership of a producing mine solves the steel company's problem of securing its supplies of the raw material at a low price, and several of the big companies have already invested in fluorspar properties."

Machinery Markets and News of the Works

RAILROADS STILL BUYING

Their Purchases Are the Most Important in Machine-Tool Markets

Southern Railway Has Placed Large Orders and Norfolk & Western May Buy Soon

The Southern Railway has placed orders for practically all of the tools contained in the list it issued a few months ago. This business was distributed among a number of makers and in the aggregate is the most important buying of the past week. Early action is expected on the list of the Norfolk & Western Railroad, to which two items were added a few days ago. The Santa Fe list, at Chicago, now of large proportions, is dormant and no predictions are made as to when these machines will be bought. The latest railroad inquiry in that district is from the Union Pacific, which asks for prices on about 20 tools. Other railroads are buying in lots of one or two tools at a time. The New York Central is placing some orders almost every week.

Buying of tools by industrial companies is very greatly limited, consisting almost entirely of single-tool orders. The Greater Western Mfg. Co., Leavenworth, Kan., has put out an inquiry for 36 tools to replace those destroyed in a recent fire. This is the largest proposition before the Middle Western trade. The Gary Tube Co. and the Youngstown Sheet & Tube Co. are expected shortly to place orders for machines needed at plants in the Chicago district.

Although Japanese machine-tool business has not materialized to any large extent, it is expected that there will be considerable buying from that country before the end of the year. Hundreds of metalworking plants in the Tokio and Kanagawa districts were wholly or partially destroyed in the earthquake and most of these will be rebuilt.

New York

NEW YORK, April 29.

EXCEPT for railroad buying and inquiry the machine-tool market has little in it of interest. The Southern Railway, at Washington, has probably closed for almost all of the tools on its list issued some weeks ago. The Norfolk & Western, whose inquiry for more than 100 tools was published a week ago, has added to this list inquiries for a 30-in. engine lathe and a precision horizontal, boring, drilling and milling machine. The Cleveland, Cincinnati, Chicago & St. Louis Railroad has bought two 5-ft. radial drills. The Montreal Municipal Yards, Montreal, bought one 5-ft. radial drill. The Universal Portland Cement Co., Chicago, also bought a 5-ft. radial drill and the New York Central bought a 42-in. boring mill. Otherwise business has been unimportant, consisting almost entirely of scattered orders for one machine.

Plans are under way by the Bwana M'Kubwa Copper Mining Co., Ltd., London, England, for the construction of a new plant at Bwana, South Africa. It will have a daily capacity of 1000 tons of ore and machinery and equipment will be purchased at an early date. Edmund Davies is managing director. The estimated cost of the new project is £450,000.

The Electruck Corporation, 536-40 West Forty-sixth Street, New York, incorporated with $1,000,000 capital stock, will manufacture electric delivery vehicles, having purhased a building containing 68,000 sq. ft. of floor space. Complete body building equipment will be installed. W. S. Ward is vice-president.

Contract has been let by the American Can Co., 120 Broadway, New York, to the A. W. Quist Co., Hoge Building, Seattle, for a five-story addition to its Seattle plant, 140 x 320 ft., estimated to cost $500,000 with machinery.

The Ford Motor Co., Highland Park, Detroit, is reported to be completing arrangements for the purchase of property on the Thames River, London, England, for a new plant, primarily for the production of motor buses, estimated to cost $750,000 with machinery. It will approximate 225 acres of floor area, giving employment to 14,000 operatives, and will be operated in conjunction with its present works at Manchester.

The W. L. Schupp Co., Quail Street, Albany, N. Y., is planning to purchase a number of machine tools and otner equipment for repair shop.

The International Cement Corporation, 342 Madison Avenue, New York, is disposing of a preferred stock issue of $2,000,000, a considerable portion of the proceeds to be used for expansion. The company is closing negotiations for the purchase of a plant at Norfolk, Va., which will be enlarged, making the eighth cement mill operated by the organization. Holgar Struckmann is president.

The New York Edison Co., Fifteenth Street and Irving Place, New York, has acquired property adjoining a site now held at 170-74 West Sixty-fourth Street, and plans to use the entire site for a power house.

The Commissioner of Plant and Structures, Municipal Building, New York, has plans for a housing station for equipment, with machine and repair shop, at Second Avenue and Eleventh Street. A similar works, with destructor plant, will also be erected at 139th Street and the Harlem River. The structures will involve more than $350,000 with equipment.

Work will begin on a seven-story automobile service, repair and garage building, 75 x 103 ft., at 207-11 West Seventy-sixth Street, New York, to cost about $225,000 including equipment, for which plans have been drawn by William Wiegand, 17 West Forty-second Street, architect.

The New York Steam Corporation, 280 Madison Avenue, New York, is arranging for an increase in capital from $5,000,000 preferred stock, to 100,000 shares of stock, no par value, the proceeds to be used for extensions in power plants and system, including additional equipment.

Moses B. de Marchena, Camaguey, Cuba, former owner of a local sugar mill, is forming the Siboney Sugar Co., capitalized at $2,000,000, to construct and operate a new refinery in the Camaguey Province, to cost approximately $1,200,000 with machinery.

The Board of Education, Bloomfield, N. J., has plans for a one-story manual training school, to be known as Opportunity School No. 10, estimated to cost $80,000, for which bids are being asked on a general contract until May 5. John E. Capen, 207 Market Street, Newark, is architect.

The New Jersey Power & Light Co., Dover, N. J., has secured permission to dispose of bonds for $325,000, and stock for $79,000, a portion of the proceeds to be used for extensions in electric power plants and system.

The County Vocational Schools Board, 31 Clinton Street, Newark, has voted a fund of $250,000 for the construction of a boys' vocational school at Irvington, for which plans will soon be prepared.

The American Transformer Co., 174-82 Emmet Street, Newark, manufacturer of electric transformers and apparatus, has acquired an adjoining building, 75 x 100 ft., for extensions in its plant.

P. J. Sassano, 276 Sanford Street, East Orange, N. J., has filed plans for a one-story machine shop.

The Crane Market

Few purchases of locomotive or electric overhead cranes are noted in proportion to the volume of inquiries. Contractors and other potential users of locomotive cranes have issued inquiries or expressed themselves as interested in buying, but there is evidently little inclination to place orders. Henry L. Doherty & Co., 60 Wall Street, New York, have asked for estimates on a 60-ton overhead crane, but the formal inquiry is not yet available. Asano Bussan & Co., 165 Broadway, New York, have been receiving bids on a 3-cu. yd. bucket handling crane, 39-ft. span, for export to Japan. The Great Northern Railway, St. Paul, Minn., has asked for prices on a 30-ton, 50-ft. boom, self-propelling locomotive crane. The Lehigh Valley Railroad, New York, has closed on two 25-ton gantry cranes. The Bridgeport Safety Emery Wheel Co., Bridgeport, Conn., is interested in purchasing a 15-ton, 27-ft. span, overhead crane, 220 volts, 60 cycles, 3-phase.

From Pittsburgh it is reported that the National Tube Co. will not place all the 19 cranes for its new Gary tube works, but plans to award only about half that number and defer the rest until the need of additional conveyors becomes more pressing. Similarly, the Westinghouse Electric & Mfg. Co. is expected to cut the number of cranes it will need for the early operation of the enlarged transformer plant at Sharon, Pa. This project originally called for 12 cranes, including a 75-ton, 50-ton and 30-ton. The Lorain Steel Co., Johnstown, Pa., is expected to close in a few days for a 20-ton crane with 5-ton auxiliary. Competition in the Pittsburgh district is very sharp and the market is best described as a buyers' affair.

Among recent purchases are:

Jones & Laughlin Steel Corporation, Pittsburgh, a 20-ton, 96-ft. 6-in. span overhead crane with 5-ton auxiliary; two 15-ton, 100-ft. span and one 15-ton, 76-ft. 4-in. span for new bar mill at Woodlawn, Pa., and one 15-ton, 40-ft. span for the power house, all from the Cleveland Crane & Engineering Co.

Canadian Westinghouse Co., Ltd., Hamilton, Ontario, one 5-ton 4-motor traveling wall crane with 25-ft. reach and a 1-ton, 4-motor traveling wall crane with 20-ft. reach, from the Milwaukee Electric Crane & Mfg. Co.

H. K. Porter Co., Pittsburgh, a 5-ton and a 3-ton overhead traveling cranes, from the Northern Engineering Works.

Pittsburgh Spring & Steel Co., Pittsburgh, a 10-ton trolley, from the Shaw Electric Crane Co.

American Laundry Machinery Co., Rochester, N. Y., a 3-ton, 21-ft. span, single I beam crane, from the Shepard Electric Crane & Hoist Co.

Tidewater Power Co., Wilmington, N. C., a 2½-ton, cage control, monorail hoist, from the Shepard Electric Crane & Hoist Co.

Pacific Fruit Express, three ice handling cranes, 2400-lb. capacity, 32 and 39-ft. spans, from the Shepard Electric Crane & Hoist Co.

Dwight P. Robinson, New York, a 100-ton overhead crane for the Los Angeles Electric Light & Power Co., from a Central Western builder.

Mansfield Foundry Co., Mansfield, Mass., a 10-ton, 27-ft. 6-in. span overhead crane, from the Pawling & Harnischfeger Co.

Ohio Building Material Co., Cleveland, a 30-ton locomotive crane, from the Ohio Locomotive Crane Co.

United States Metals Refining Co., New York, a 25-ton locomotive crane from the American Hoist & Derrick Co.

Binghamton Light, Heat & Power Co., Binghamton, N. Y., two 5-ton hand power cranes from the Roeper Crane & Hoist Works.

Glen Gery Shale Brick Co., Wyomissing, Pa., an 8-ton, double I beam hand power crane from the Roeper Crane & Hoist Works.

Bolger Stone Co., Norristown, Pa., a 5-ton single I beam hand power crane from the Roeper Crane & Hoist Works.

Siems-Stembel Co., St. Paul, Minn., four 3-ton 15-ft. span, one 3-ton, 30-ft. span and one 3-ton, 20-ft. span hand power cranes from the Roeper Crane & Hoist Works.

Bates Expanded Steel Truss Co., East Chicago, Ind., a 1-ton, 34-ft. span, 2-ton, 33-ft. 8-in. span, 5-ton, 41-ft. span, 1-ton, 41-ft. span and 1-ton, 28-ft. 6-in. span, all 3-motor overhead traveling cranes from the Roeper Crane & Hoist Works.

D. M. Bare Paper Co., Roaring Springs, Pa., a 5-ton, 38-ft. 1-in. span, single I beam hand power crane, from the Roeper Crane & Hoist Works.

Blaw-Knox Co., Pittsburgh, which was reported recently to have ordered a 40-ton electric traveling crane from the Whiting Corporation, did not place a new order but revised an order already placed for two 10-ton cranes, substituting a 40-ton crane for one of the 10-ton cranes.

Frank Perna, Terminal Building, Hoboken, N. J., architect, is taking bids for a one and two-story automobile service and repair building, 100 x 100 ft., at Fourteenth Avenue and Twelfth Street, Newark, estimated to cost $100,000 with equipment.

The Handy Machine & Tool Engineering Co., 211 Centre Street, New York, has leased property adjoining its present works for extensions.

The Associated Gas & Electric Co., 61 Broadway, New York, is arranging for a bond issue of $4,500,000, a portion of the proceeds to be used for the purchase of a controlling interest in the Staten Island Edison Co. and for extensions in power plant and system.

Philadelphia

PHILADELPHIA, April 28.

BIDS will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until May 13, for a quantity of copper tubing for the Philadelphia Navy Yard, schedule 2124.

Contract has been let to Barclay White & Co., 1713 Sansom Street, Philadelphia, for the new seven-story plant of the Western Electric Co., 195 Broadway, New York, to occupy the entire block on Allegheny Avenue, Clearfield, B and Ormes Streets, 158 x 500 ft., to cost $900,000. The Ballinger Co., Twelfth and Chestnut Streets, is architect.

I. Halpern Brothers & Co., Inc., 1333 North Front Street, Philadelphia, manufacturer of metal products, has acquired the former plant of Walter E. Knipe & Sons, Inc., Berks, Hancock and Paletorp Streets, textile dyers. The new owner plans to remodel the property for a new plant.

Fire, April 20, destroyed a portion of the power house and mill of the Endura Mfg. Co., Sixty-third and Eastwick Streets, Philadelphia, manufacturer of oil-proof papers, etc., with loss estimated at $100,000 including equipment. It is planned to rebuild.

The William Cramp & Sons Ship & Engine Building Co., Richmond and Norris Streets, Philadelphia, is arranging for a concentration of manufacturing facilities at its local plant, including expansion in the I. P. Morris department, manufacturer of water turbines and other power equipment; and the De La Vergne Machine Co., 1136 East 138th Street, New York, manufacturer of ice and refrigerating machinery, both subsidiaries. J. H. Mull is president and general manager.

The Philadelphia Rapid Transit Co., 810 Dauphin Street, Philadelphia, is arranging for a bond issue of $1,000,000, of which more than one-half will be used for extensions including work at the new southern car terminal, $300,000; new automatic power substation at Fox Chase, $90,000; additional rotary converter and auxiliary machinery at the Ranstead substation, $45,000; shop facilities and equipment, and signals for the Market Street Elevated Railway, $100,000, and emergency mechanical and utility equipment and housing, $81,000.

The Victor Talking Machine Co., Camden, N. J., has tentative plans for a ten-story addition, 70 x 170 ft., totaling 120,000 sq. ft. of floor area, estimated to cost $1,000,000. It also purposes to construct an addition to its branch plant in South America, operated under the name of the Pan-American Recording Co., and to equip its new branch factory at Oakland, Cal., now in course of erection on a 20-acre site, where additional units will be built later. Negotiations are under way for the purchase of a controlling interest in the Berliner Gramophone Co., Ltd., Montreal, and the expansion of plant facilities. Eldridge R. Johnson is president.

The Jordan Motor Co., 718 Wright Street, Camden, N. J., has plans for the erection of a one-story service and repair building at Haddon Heights, N. J., 65 x 180 ft., on the Kings Highway, to cost about $85,000. The company is representative for the Jordan car. Thomas Stephens, Temple Building, Camden, is architect.

The Thomas Maddock's Sons Co., Ewing and Perry Streets, Trenton, N. J., manufacturer of sanitary ware.

has awarded a general contract to the Charles J. Smith Construction Co., 202 Academy Street, for its proposed plant at Hutchinson's Mills, to cost $750,000 with machinery.

The Reading Hardware Co., Sixth and Willow Streets, Reading, Pa., will build a three-story power house to cost $85,000 with equipment.

The Air Reduction Sales Co., Inc., 342 Madison Avenue, New York, has awarded a general contract to the Central Construction Corporation, Seventh and Emerald Streets, Harrisburg, Pa., for the erection of the first unit of its Harrisburg works, one-story, estimated to cost $75,000. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects.

Following the completion of its new generating plant at a cost of $3,000,000, the East Penn Electric Co., Pottsville, Pa., plans improvements in its local steam-operated electric power plant, converting the station for auxiliary service.

The Commonwealth Slate Co., Berlinsville, Northampton County, Pa., will install equipment for a quarry on about 100 acres. The company is also reported to be considering the establishment of a finishing mill for blackboard, roofing and other slate. John Spade is president and general manager, and George H. Richter, secretary and treasurer.

The Standard Paper Box Mfg. Co., 441-45 Pearl Street, Reading, Pa., has taken out a permit for a four-story addition to cost $45,000 including equipment.

Manual training equipment will be installed in the new junior high school to be erected at Bloomsburg, Pa., for which a bond issue of $375,000 is being arranged. It will replace a building destroyed by fire a number of months ago. Plans have been approved. Ritter & Shay, North American Building, Philadelphia, are architects.

The American Car & Foundry Co., Berwick, Pa., has begun the erection of a new machine shop on the 50-acre tract near the outskirts of the city, recently acquired, and will proceed with the construction of a car shop for the manufacture of box and wood gondola cars. Other buildings will include a planing mill, assembling shop and power house. It is purposed to remove the present plant to the new location, about one-half mile from the steel car works, and raze the different buildings now in use.

Contract has been awarded to the Stender Brothers Construction Co., Scranton, Pa., for a two-story, 65 x 150 ft., brick and steel factory for the Scranton Plate Glass Co., estimated to cost $60,000. Considerable new machinery and equipment will be purchased including an electric traveling crane. I. C. Almar is manager in charge.

The Hilton Cutlery Co., 1704 Sansom Street, Philadelphia, has been incorporated with capital stock of $200,000. It will purchase a factory, preferably near Philadelphia, and is ready to receive quotations on equipment. Will J. Hilton is managing director.

Buffalo

BUFFALO, April 28.

A FEW used tools are moving, constituting about the only activity in the machine tool market. Inquiry and buying are both light. The Herschell-Spillman machinery is still on the market. It is reported an out-of-town motor manufacturer is about to purchase $75,000 worth for the manufacture of motors. Several of the machines were sold in outside points and the Spillman Engineering Co. of Tonawanda, a separate concern, purchased a couple of lathes, a radial drill and a milling machine. A local manufacturer of power saws sold two large saws during the week, one to the Bethlehem Steel Co., and another to a railroad in Massachusetts. Dealers do not appear to be stocking. The Pierce-Arrow Motor Car Co. bought 14 lathes from Henry Prentiss & Co.

The Simonds Saw & Steel Co., Lockport, N. Y., has begun the construction of two additions, one to the hammer shop, 80 x 100 ft., in which a 7-ton steam hammer will be installed. The other is an addition to a rolling mill, 45 x 140 ft., which will house new annealing equipment. Morris & Allan, Inc., is the Buffalo contractor in charge of the erection.

The Buffalo General Electric Co., Electric Building, Buffalo, is arranging a fund of $3,000,000 for extensions in power plants and system during the present year, including the erection of a new automatic power substation. Charles R. Huntley is president.

The American Woodworking Machinery Co., 591 Lyell Avenue, Rochester, N. Y., has awarded a general contract to Alexander, Shumway & Utz, 16 State Street, for a three-story addition, 60 x 100 ft., to cost $45,000.

New interests recently acquiring the Conley Camera Co., Rochester, Minn., have purchased the Seneca Camera Mfg. Co., Central Avenue and Chatham Street, Rochester, N. Y., and will consolidate the two companies. Plans are under way for the removal of the New York business to the Minnesota works, which will be enlarged. A distributing and sales branch will be maintained at the former Seneca works.

The Northern New York Utilities, Inc., Watertown, N. Y., will take over and consolidate the Rome Gas, Electric Light & Power Co., Rome, N. Y. Plans are under way for extensions, and the construction of a high-tension transmission line. F. L. Carlisle is chairman of the board of the purchasing company.

The Dairymen's League Co-Operative Association, 333 Lafayette Street, Utica, N. Y., plans for the installation of ice and refrigerating equipment at its proposed distributing plant at Perry, N. Y., to cost approximately $150,000.

Gaylord Brothers, 32 North Union Street, Rochester, N. Y., have awarded a general contract to W. F. Martens, 42 East Avenue, for a two-story automobile service and repair building, 100 x 200 ft., estimated to cost $110,000 with equipment. Alexander McCord, Powers Building, is architect.

The Common Council, Liverpool, N. Y., is considering the installation of electric-pumping machinery in connection with the proposed waterworks, estimated to cost $150,000. I. R. Fairchild is president.

The Syracuse Lighting Co., Syracuse, N. Y., is perfecting plans for a new hydroelectric generating plant on the Salmon River, about 40 miles from the city, to cost more than $700,000. A steel tower transmission line will be constructed, as well as an automatic power substation near the city limits. The last noted is estimated to cost $400,000. The company is a subsidiary of the United Gas Improvement Co., Broad and Arch Streets, Philadelphia.

The Best Garage, West Water Street, Syracuse, N. Y., plans the erection of a three-story service, repair and garage building, adjoining the present works, to cost $100,000.

Manual training equipment will be installed in the three-story high school to be erected at LeRoy, N. Y., estimated to cost $225,000, for which foundations will soon be laid. Tooker & Marsh, 101 Park Avenue, New York, are architects. E. B. Taylor is superintendent of schools.

The Common Council, Attica, N. Y., is considering the installation of electric-operated pumping equipment in connection with proposed extensions in the municipal waterworks, estimated to cost $55,000.

The Edward C. Chappelle Co., Cazenovia, N. Y., organized with capital stock of $250,000, plans to manufacture an improved system of piping for hot-air furnaces and will establish a chain of shops throughout the country. Tinners' tools and machines are the only equipment now needed.

Detroit

DETROIT, April 28.

TENTATIVE plans are under advisement by the Detroit Street Railways, Administration Building, St. Jean and Shoemaker Avenues, for the erection of an electrical and mechanical repair shop on Detroit Street, Highland Park, estimated to cost $75,000 with equipment. William B. Mayo is general manager.

The Consumers Power Co., Jackson, Mich., has advanced its appropriation of $15,000,000 for extensions during the year to $21,000,000, and as a part of the increase has authorized plans for an addition to the steam-operated electric power plant on Wealthy Street, Grand Rapids, Mich., to cost about $1,800,000 with equipment. The appropriation also provides for the construction of a third unit to the steam-operated generating plant on the Saginaw River to cost $1,500,000 with machinery.

Fire, April 21, destroyed the foundry of the H. D. Lee Co., Plymouth, Mich., with loss estimated at $22,000. It is planned to rebuild.

The General Electric Co., Schenectady, N. Y., has plans out for bids for the erection of a five-story factory branch and distributing works at Third and Antoinette Streets, Detroit, 75 x 200 ft., estimated to cost $300,000 with equipment. Local offices of the company are in the Dime Bank Building.

The Detroit Edison Co., 2000 Second Avenue, Detroit, is taking bids until May 15, for the construction of foundations and superstructure for a new electric generating plant at French Landing, Huron River, about 20 miles from Detroit. Gardner S. Williams, Cornwell Building, Ann Arbor, Mich., is consulting engineer in charge. Contracts for equipment will be placed later.

Manual training equipment will be installed in the three-story and basement Whittier junior high school to be erected on Pasadena Avenue, Flint, Mich., estimated to cost $750,000, for which foundations will soon be laid. Malcolmson & Higginbotham, F. P. Smith Building, are architects.

The Universal Skid-Less Chain Co., Niles, Mich., recently organized, has authorized the erection of a one-story plant, 60 x 160 ft., to cost approximately $25,000 with equipment.

William Ford & Co., Dearborn, Mich., recently incorporated with $150,000 capital stock, will manufacture automotive equipment. Plans provide for erection of a factory on property purchased from the Ford Motor Co. Mr. Ford and J. E. Miller head the company.

New England

BOSTON, April 29.

THE machine tool market is dull and sales of new and used machines costing more than $250 each are few. Activity, if it can be termed such, centers in bench tools, small tools and machine tool parts. In competition with machine tool dealers, manufacturers having an excess of plant and machinery capacity are offering tools at attractive prices. A maker of ball bearings in this territory has just issued such a list covering a wide variety of equipment. In at least one instance a Massachusetts machine-tool builder has sold planers, in use in the shops, at prices that used tool dealers could not hope to meet.

A falling off in new prospects also is reported, and a large percentage of old prospects show no signs of closing. Returning confidence in the textile industry is on the decline again in the machine tool trade.

For the first time in months the Locomobile Co., Bridgeport, Conn., plant practically is on full time with a force, approximating 600. In addition to producing Locomobile cars, the company is preparing to shortly place on the market a new automobile, and is producing parts for Durant automotive products. One other New England automobile manufacturer is well occupied, but most of them are endeavoring to work out of financial difficulties. The Marlin Fire Arms Co., New Haven Conn., is preparing to resume operations.

The Governor of Massachusetts has signed a bill authorizing the Boston Elevated Railway Co. to issue additional bonds and other evidences of indebtedness to the amount of $2,232,000, which brings the purchase of equipment for the company's new car repair shops at Everett, nearer. He also has signed a measure providing for an investigation as to the advisability of the State acquiring the Victory plant, Quincy, Mass., for use as a public terminal. If purchase of this property is made by the State, cranes will be required.

The General Electric Co., Pittsfield, Mass., has awarded contract for a one-story, 88 x 400 ft. addition for the manufacture of super-transformers. An extension to the company's core reactor plant also will be erected.

Plans will be ready about June 1 for a proposed 100 x 100 ft., 115 ft. high boiler plant addition for the Narragansett Electric Light Co., 800 Turks Head Building, Providence, R. I. Jenks & Ballou, 10 Weybosset Street, Providence, are the architects.

Excavations have started for a one-story, 45 x 60 ft. with a wing 12 x 15 ft. machine shop in Medford, Mass., by Herbert H. Staples. Thomas Hixon, 119 Water Street, Boston, is the architect.

The American Crystal Co., 53 Randolph Avenue, Waterbury, Conn., will build a one-story, 90 x 185 ft. manufacturing factory on Mill Street. Plans are private. Polishing machinery is required.

Cram & Ferguson, 248 Boylston Street, Boston, have completed plans for a two-story power house to be erected by Wheaton College, Norton, Mass., of which S. V. Cole is president.

Plans and specifications are nearly ready for a one-story machine shop and other units to be erected by the city of Lawrence, Mass. Walter T. Rochefort is mayor. J. Broadhurst, 45 Broadway, Lawrence, is the architect.

The Danbury Iron Works, Danbury, Conn., a new industry, is erecting two two-story manufacturing units, miscellaneous equipment for which is required. John Macuch is president.

Fire did about $8,000 damage last week in the machine shop of Alexander Shaw, 180 Walnut Street, Athol, Mass. Repairs will be made as soon as insurance adjustments are completed.

The Strand & Sweet Co., Winsted, Conn., wire insulators, which recently increased its capital from $50,000 to $100,000, has purchased from E. P. Wilcox, approximately 15 acres on the Central New England Railway, where it is proposed to erect a 100 x 150 ft. manufacturing plant. Ralph E. Strand is president.

The City Council, New Bedford, Mass., has plans nearing completion for a one-story municipal automobile service, repair and garage, estimated to cost $65,000. Bids will soon be asked on a general contract. Leary & Walker, 908 Purchase Street, are architects.

The Yale & Towne Mfg. Co., Stamford, Conn., manufacturer of builders' hardware, etc., has filed plans for the erection of a one-story addition, to be used as a foundry.

The Lockwood Mfg. Co., Raymond and Day Streets, South Norwalk, Conn., manufacturer of builders' hardware, is asking bids on general contract for a three-story addition, 55 x 72 ft. A. Nettleton Paddock, 59 Seaview Avenue, is architect.

Edward Radding and Aldrich B. Dexter, 114 Westminster Street, Providence, R. I., will remodel a building at West Park and Promenade Streets, for an automobile service, repair and garage building, estimated to cost $100,000.

The Edison Electric Illuminating Co., 39 Boylston Street, Boston, has plans for a five-story automatic power substation, 70 x 80 ft., to be known as substation No. 72, estimated to cost $150,000. The J. R. Worcester Co., 79 Milk Street, is architect.

Chicago

CHICAGO, April 28.

INQUIRIES continue to appear, although actual buying still lags. In view of the large amount of pending business, the placing of only a portion of it would mean much to the dealers. The Gary Tube Co. and the Youngstown Sheet & Tube Co., are expected to take early action on their requirements in this district, but no word has been given out as to when the extensive Santa Fe list will be acted upon. The latest railroad inquiry is for 20 tools issued by the Union Pacific. Another large list comprising 36 machines has been put out by the Great Western Mfg. Co., Leavenworth, Kan., whose plant was recently destroyed by fire.

Union Pacific List

(All machines to be motor-driven)

One cylinder grinder, similar to style 55 Heald.
One 96-in. heavy duty tire mill, swing 100 in.
Two extra heavy duty axle lathes.
One 90-in. wheel quartering machine with crank pin turning attachment.
Two heavy pattern 3 x 24-in. double emery grinders.
One portable locomotive cylinder boring bar.
One universal tool grinding and shaping machine.
One 36-in. engine lathe, 9 ft. 6 in. between centers.
One 17-in. heavy duty engine lathe, 6 ft. between centers.
One 18-in. engine lathe, 6 ft. between centers.
One 20-in. engine lathe, 6 ft. 2 in. between centers.
One 28-in. heavy duty crank shaper.
One 36-in. heavy pattern upright drill press.
One 20-in. heavy pattern upright drill press.
One 10-in. double end axle cutting off and centering machine.
Two 32-in. extra heavy duty railroad and manufacturing shapers.
One 36 x 36-in. x 14-ft. planer with two rail heads and one side head.

Great Western Mfg. Co., Leavenworth, Kan.

One 48 to 54-in. engine lathe, 10 to 12 ft. between centers.
One 28 to 30-in. engine lathe, 24 ft., or more, between centers.
One 26-in. engine lathe, 8 to 10 ft. between centers.
One 24-in. engine lathe, 8 to 10 ft. between centers.
One 20-in. engine lathe, 6 to 8 ft. between centers.
One 18-in. engine lathe, 6 to 8 ft. between centers.
Two 21-in. Gisholt, or equivalent, large bore turret lathes.
One 24-in. Gisholt, or equivalent, large bore turret lathe.

One 60-in. pulley turning lathe.
One 50-in. pulley turning lathe.
One 30-in. pulley turning lathe.
One 20-in. pulley turning lathe.
One 10-in. pulley turning lathe.
One 60-in. boring mill.
One 50-in. boring mill.
One 24-in. boring mill.
One 26 x 26-in. x 8-ft., or larger, planer.
One open side planer 42 to about 50 in. with bed about 12 to 16 ft.
One milling cutter grinder.
One cutting off machine for cutting shafting.
One shaft straightening machine.
One No. 2 or 3 milling machine.
One shaft keyseating machine.
One 2½-ft. radial drill.
One 3-ft. radial drill.
One 3½-ft. radial drill.
One 4-ft. radial drill.
One 4½-ft. radial drill.
One 30 or 32-in. upright drill with tapping attachment.
One 24-in. upright drill with tapping attachment.
One each 8-in., 10-in., 12-in., 14-in. and 16-in. sensitive drills.

The Chicago, North Shore & Milwaukee Railroad, 72 West Adams Street, Chicago, will start work May 1 on the construction of the first unit of new shops on a 65-acre tract in Tenth Street, Waukegan, Ill. The painting department and a garage will first be built to serve the company's bus lines. Repair shops, electrical and maintenance of way buildings and general offices will be erected later. This will mean the removal from Highwood of the present shops of the company, which have been outgrown.

The National Biscuit Co., 110 North Morgan Street, Chicago, has awarded a contract for a four-story factory, 118 x 265 ft., at Polk and Maplewood Streets, to cost $1,000,000.

The Russell Electric Co., 340 West Huron Street, Chicago, has purchased from the Brunswick-Balke-Collender Co. what was formerly its north side works, comprising 59,000 sq. ft., or practically the entire block lying between Huron and Superior Streets on the south and north, and Orleans and Sedgwick Streets on the east and west.

The P. H. Magirl Foundry & Furnace Works, Bloomington, Ill., is erecting an addition, 50 x 95 ft.

The Des Moines Electric Co., Des Moines, Iowa, has started work on the substructure of the first unit of an electric power station to cost $6,000,000.

E. G. Stage, formerly superintendent Westover Steel & Iron Works, Lincoln, Neb., has opened a jobbing foundry in that city.

The Pennsylvania Power & Light Co., Sioux City, Iowa, has purchased the Hazleton plant of the Worthington Pump & Machinery Corporation, better known as the Jeanesville Iron Works. The power company will convert the plant into a maintenance shop for its system. Service motor trucks will be repaired and transformer assembling will be done, together with other metal work. The plant will also be used for repair work for the construction department and as a central storehouse.

The Tide Water Oil Corporation, 3433 South Racine Avenue, Chicago, has plans for a two-story oil storage and distributing plant, 110 x 400 ft., at 1441 West Thirty-seventh Street, to cost $150,000 including equipment. A. Epstein, 2001 West Pershing Road, is architect and engineer.

The Village Council, Herman, Minn., G. I. Haney, recorder, will receive bids until May 5 for pumping equipment for the waterworks system. Corey & LeCocq, Aberdeen, S. D., are engineers.

The City Council, Springfield, Ill., plans the installation of electric-operated pumping equipment in connection with extensions in the municipal waterworks, estimated to cost $450,000. The Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

The Commonwealth Edison Co., 72 West Adams Street, Chicago, has plans for a three-story automatic power and switching station, 40 x 205 ft., at Fisk Street and the Chicago River, estimated to cost $100,000 with equipment. Holabird & Roche, 104 South Michigan Avenue, are architects.

The Board of Education, O'Neill, Neb., is considering plans for the construction of a central power plant for local schools, estimated to cost $80,000. J. C. Harnish, secretary.

The Nebraska Power Co., Fifteenth and Farnum Streets, Omaha, Neb., will begin the erection of a one-story and basement distributing and repair works, with service and repair garage for company motor trucks and cars, 115 x 260 ft., at 4310 Leavenworth Street, to cost about $160,000 including equipment. F. S. Stott, Kennedy Building, is architect.

Contract has been awarded to the Schmidt Brothers Construction Co., Sterling, Ill., for a one-story, 100 x 127-ft. brick factory on Third Avenue for the Peerless Level & Tool Co. Transmission and conveying equipment will be required.

Milwaukee

MILWAUKEE, April 28.

FRESHENING of inquiries and a slightly improved sales volume characterized the week in the local machine-tool market. In most instances, however, sales in April will fall below the average month for a year, due to the decline in orders as March closed. It is believed, however, that a recovery has come and prospects for May and June business are regarded favorably. Caution is evident in all lines and this is checking new buying.

The Bucyrus Co., South Milwaukee, Wis., manufacturer of steam shovels, etc., will erect a one-story addition, 30 x 120 ft., to its tool room and is buying miscellaneous equipment. W. W. Coleman is president and general manager.

The Stoughton Wagon Co., Stoughton, Wis., manufacturer of motor trucks, motorbuses and other heavy duty vehicles, has completed the purchase from the Midwest Company, Indianapolis, of the design, tools, and considerable equipment for manufacturing the Midwest truck engine. A part of the works at Stoughton is being remodeled as an engine plant, and the layout acquired from the Midwest interests will be augmented by additional purchases of tools. F. J. Vea is president and general manager.

The A. H. Petersen Mfg. Co., Milwaukee, manufacturer of electric drills and other electric-driven tools, sustained almost a total loss of plant and equipment by fire on April 20. The machine shop was wrecked and nearly all of the equipment damaged beyond repair. Adjustments of insurance are being made and plans for reconstruction will be formulated as soon as settlement is completed. Arno H. Petersen is president-treasurer and general manager.

The Allis-Chalmers Mfg. Co., Milwaukee, has acquired the mining, crushing, cement and creosoting machinery department of the Worthington Pump & Machinery Corporation, at Cudahy, which originally was established by the Power & Mining Machinery Co., merged with the Worthington interests a number of years ago. The transfer becomes effective May 1. The Allis-Chalmers Company will add the Cudahy works to its main plant in West Allis, taking over virtually the entire operating force. No statement has been made with respect to the disposition to be made of the building at Cudahy by the Worthington company.

The Highway Trailer Co., Edgerton, Wis., manufacturer of trailers, axles, wheels, couplers, etc., will start work May 1 on the reconstruction of the portion of its works damaged by fire nearly two years ago, adjustment of the loss having been made only recently. About $75,000 will be invested in building and new equipment. The general contract has been let to the Wisconsin Bridge & Iron Co., Milwaukee. James W. Menhall is general manager of the Highway company.

The Becker Mfg. Co., Two Rivers, Wis., founder and machinist, has plans for an extension to its gray iron foundry and coreroom, estimated to cost $25,000. Work will begin May 1. Frank and Michael Becker are proprietors and managers.

The Commercial Mfg. Co., La Crosse, Wis., has been incorporated with a capital stock of $10,000 to manufacture automobile equipment, materials and accessories. A building has been leased and will be equipped at once. Oscar Wotsel, Joseph K. Kidder and John Nesler are the principals.

The Morris Foundry Co., Fond du Lac, Wis., manufacturer of brass, bronze and aluminum castings, is completing an extension, 35 x 100 ft., to accommodate a new stamping and polishing department, equipment for which is now being purchased. Newton Morris is now sole owner, having acquired the interest of his brother, Oscar Morris, a short time ago.

The Board of Public Works, Two Rivers, Wis., is taking bids for furnishing and installing in the city water and light plant two motor-driven centrifugal pumping units, each with a capacity of 750 gal. per min., against 60 lb. pressure. H. C. Gowran is chairman.

William M. Rettinger, Bourbon, Ind., has purchased acreage at Nekoosa, Wis., for a factory for the production of power and electrically-driven washing machines, which he has been manufacturing on a small scale for several years. The first building will be 30 x 120 ft., one story, and an investment of $25,000 is planned.

Trustees of School District No. 4, village of Shorewood, Milwaukee County, Wis., are taking bids until May 5 for a high school with vocational training departments. It will be 100 x 200 ft., three stories and full basement, and was designed by Herbst & Kuenzli, architects, 722 Caswell

Block, Milwaukee. The cost is estimated at $250,000. Hugo Kuechenmeister is clerk of the board.

The Superior Water, Light & Power Co., Superior, Wis., has appropriated $100,000 for the construction of an additional gas holder and producer equipment, and $100,000 for other improvements and replacements in the various plants. W. C. Lounsbury is president and general manager.

The North Milwaukee, Wis., Board of Education has let the general contract to Daniel B. Danielson, 874 Laytoon Boulevard, Milwaukee, for a new high school and vocational training institute costing about $225,000 complete. The architects are Van Ryn & DeGelleke, 114 Grand Avenue, Milwaukee. E. F. Neumann is secretary of the board.

Gjertson Brothers, Stoughton, Wis., are starting construction on a public garage, salesroom and repair shop, 38 x 100 ft., two stories and basement, and are inquiring for a complement of shop equipment.

The Wisconsin Metal Products Co., Sixteenth and Ann Streets, Racine, Wis., has placed the general contract with Bondgard & Christensen, 1135 Mound Street, local for its new plant, 100 x 250 ft., one story, at DeKoven and Phillips Avenues. The output of steel stampings, drawnware and metal specialties will be largely increased and purchase of additional presses and other equipment will be made at once. The total cost is estimated at $125,000 to $150,000.

The Scovill Mfg. Co., Waterbury, Conn., which some time ago acquired the Hamilton-Beach Mfg. Co., Racine, Wis., will transfer considerable equipment in the removal of the electrical appliance department from Waterbury to Racine about May 1, when the Hamilton-Beach works will increase the operating force by about 200. The Racine works is devoted exclusively to manufacturing fractional horsepower devices and by the transfer the Scovill company will concentrate its activities along this line. T. B. Myers is general manager at Racine.

The American Metal Products Co., Milwaukee, manufacturer of Ampco bronze castings and specialties, is completing the construction and equipment of a rolling mill as a new unit of its foundry and machine shop at Thirty-fourth Avenue and Burnham Street. Nearly all equipment has been contracted for. Carl J. Zaiser is secretary-treasurer and general manager.

The Glancy Malleable Corporation, Waukesha, Wis., expects to be ready May 1 to begin melting in its new malleable shop at Janesville, Wis., which is a conversion of the gray iron foundry of the former Janesville Machine Co., a division of the Samson Tractor Co. Practically the entire output of both the Waukesha and Janesille shops is absorbed by the Buick and Chevrolet Divisions, General Motors Corporation. A. R. Glancy is president and general manager.

Cleveland

CLEVELAND, April 28.

MACHINE tool business continues light, with orders almost entirely for single lots. The demand is largely from small industrial plants. Buyers are showing a disposition to limit their investments as much as possible and a large share of the inquiry is for used machinery. Tools for which there is the most call include punch presses, radial drills and shapers. There is virtually no business coming at present from the automobile industry. The Hoover Suction Sweeper Co., which recently bought some equipment, is figuring on several additional machines, and it is understood that the B. F. Marble Co., Bedford, Ohio, will require considerable woodworking machinery for a new plant. April business as a whole has been unsatisfactory, the volume not keeping up with March.

The Peck, Stow & Wilcox Co., manufacturer of builders' hardware and mechanics' hand tools, has placed a contract with the H. K. Ferguson Co., Cleveland, for an extension to its Cleveland plant including a forge shop, 50 x 100 ft. and a three-story manufacturing plant providing 20,000 sq. ft. of floor space. The estimated cost is $60,000.

The Columbus Bolt Works, Columbus, Ohio, is having plans prepared for a three-story plant, 100 x 240 ft.; one-story forge shop, 50 x 300 ft.; a storage shed, 50 x 167 ft., and a one-story hot bolt shop, 50 x 167 ft. Two electric traveling cranes and one locomotive crane and two 6000-lb. elevators will be required. Lockwood, Greene & Co., Hanna Building, Cleveland, are the architects and engineers.

The B. L. Marble Chair Co., Bedford, Ohio, will erect a four-story and part basement factory, 80 x 208 ft. The H. K. Ferguson Co., Cleveland, is the architect.

The village of Wadsworth, Ohio, will shortly take bids for a $100,000 sewage disposal plant. R. E. Garvin, 600 Davis & Farley Building, Cleveland, is the consulting engineer.

The city of Steubenville, Ohio, is having plans prepared for a $300,000 extension to its water works system which will include a softening and a filtration plant. Pumping equipment will be required.

R. W. Clink and K. B. Close, Fostoria, Ohio, contemplate the erection of a $50,000 ice plant in Findlay, Ohio.

The Realty Rubber Co., Massillon, Ohio, W. A. Sannbather, president, contemplates the erection of a $40,000 factory.

The Willys-Overland Co., Toledo, Ohio, has purchased property in the central manufacturing district, Los Angeles, and contemplates the construction of a new parts and assembling plant totaling about 90,000 sq. ft. of floor area, for Pacific Coast service.

The board of directors, Lutheran Orphanage, 2411 Seaman Street, Toledo, Ohio, will begin the erection of a two-story and basement power house and mechanical laundry, estimated to cost $100,000 with equipment. Bates & Gamble, Close Building, are architects.

Vocational and manual training departments will be installed in a new school to be erected at Loudonville, Ashland County, Ohio, estimated to cost $160,000, for which the Board of Education is in charge. E. V. Keplinger is clerk.

Equipment will be required in connection with a four-story garage and service station to be built by the Vance Motor Co., Central Avenue and East Ninth Street, Cleveland, estimated to cost $75,000.

Electrical pumping and other equipment will be required in connection with a sewage disposal plant to be built at Howenstine, Ohio, estimated to cost $800,000, for the city of Canton. W. E. Sarver is city engineer in charge.

Cincinnati

CINCINNATI, April 28.

THE week has been quiet in the machine tool trade, though a number of orders for single machines were booked. The Southern Railway continued its purchases of the preceding week, resulting in a widespread distribution. It is reported that price concessions were obtained on part of this business. The Norfolk & Western is expected to take quick action on its list, which closes April 30. Buying by the Sante Fe is also expected this week. Great interest is centered in the inquiry from a firm of Japanese exporters in New York for approximately 1000 machines. Local manufacturers are in receipt of this list and it is expected that orders will result.

Contrary to the general belief, plants manufacturing automotive parts and accessories are looking for a return to normal operation in May and have made no requests to hold up deliveries of machine tools on order. Buying from this source is light at present. The railroads are expected to be a big factor in the industry the rest of this year. Small manufacturing plants are busy and are taking numerous small tools. Local dealers report business this month equal to that of March, with prospects encouraging. To date there has been no curtailment of operations in machine tool plants and many have sufficient orders to insure present operations until the middle of June.

The Detroit, Toledo & Ironton Railroad has purchased a large tract at South Charleston, Ohio, and it is understood will erect a terminal, including round houses, car repair shops, and other buildings. The purchase was in accordance with the railroad's plan to straighten out the line from Ironton to Detroit and it is the intention to eliminate the haul through Springfield, which, however, will still be served by the present line as a branch.

The Ward Railway Appliance Co., Lima, Ohio, recently increased its capitalization from $50,000 to $250,000. It is reported the company contemplates moving its plant to Delphos, where a foundry will be erected.

The Elk River Sand & Gravel Co., 307 Nichol Building, Nashville, Tenn., recently formed with a capital of $150,000, is planning to equip a plant in the Estill Springs section, including crushing machinery, washing apparatus, screens, conveying and power equipment. W. W. Baird is president, and W. L. Wilkinson, secretary.

The Corporation Finance Co., Lincoln Building, Louisville, is planning for the early purchase of machinery, transmision equipment and power apparatus for installation in a proposed local fruit dehydration plant, estimated to cost $65,000.

The Union Gas & Electric Co., Fourth and Plum Streets, Cincinnati, will begin the construction of its proposed steam-operated power plant on the Ohio River, estimated to cost $1,000,000 with equipment. The company is a subsidiary of the Columbia Gas & Electric Co., same address.

The Common Council, Cookeville, Tenn., is considerng the installation of electric-operated pumping equipment in connection with a proposed waterworks and sewerage plant, estimated to cost $150,000. V. V. Long & Co., Oklahoma City, Okla., are engineers.

The Dubois Rubber & Tire Co., Chattanooga, Tenn., is said to have been acquired by new interests, headed by G. H. Kaiser, Knoxville, Tenn., and associates. The new owners plan the installation of additional equipment with a number of plant improvements.

St. Louis

ST. LOUIS, April 28.

PROPERTY at 2206 Pine Street has been leased by the Superior Electric Products Co., 4449 Easton Avenue, St. Louis, manufacturer of domestic appliances, which will remove its business to the new location. It is planned to install additional equipment.

The Missouri Pacific Railroad Co., St. Louis, is reported to have preliminary plans under advisement for rebuilding the portion of its locomotive and car shops at Fort Scott, Kan., destroyed by fire April 16 with loss estimated at $200,000 including equipment.

The Arkansas Light & Power Co., Pine Bluff, Ark., is disposing of a bond issue of $1,650,000, a portion of the proceeds to be used for extensions and the completion of the first unit of a hydroelectric generating station on the Ouachita River. Other units will be built later. H. C. Couch is president.

The St. Joseph Water Co., Eighth and Francis Streets, St. Joseph, Mo., is completing plans for extensions and the installation of two 350-hp. boilers and accessory apparatus; one 12,000,000 gal. per day high service pump; one low service pumping unit of like capacity; sterilization and other equipment, estimated to cost $550,000. W. K. Seitz is city engineer in charge. Charles H. Taylor is president.

The Shawnee Copper Co., Eminence, Mo., recently organized with a capital of $50,000, is planning for the installation of equipment at its mining properties, including steam drills, hoisting and conveying apparatus, power equipment, etc. R. E. Carr is secretary.

Bids will be received by Jewell Miller, city auditor, Chillicothe, Mo., until May 16 for extensions in the municipal power house, and one 500 hp. watertube boiler, with superheater, stoker and accessories; one stoker; brick or concrete stack, 7 ft. in diameter and 175 ft. high. E. E. Harper, 3031 Park Avenue, Kansas City, Mo., is engineer.

The Rogers Motor Co., 313 Patton Alley, Springfield, Mo., is planning for the rebuilding of the portion of its service and repair works recently destroyed by fire with loss estimated at $60,000 including equipment.

Pittsburgh

PITTSBURGH, April 28.

DEMAND for machine tools still lags. The recession in business in general and the steel trade in particular points to a quiet summer and lessens the urgency of requirements of a number of projected plant betterments. Price competition is growing sharper and the possibility of buying tools at lower levels later is causing buyers to hesitate on immediate purchases. There has been no action against the larger lists which have been before the trade for several weeks and purchases of single tools are less frequent than earlier in the year. The same tendencies are observed in the crane market.

The Hall Steam Pump Co., 213 Galveston Avenue, Pittsburgh, N. S., W. F. Gerdes, president, will erect a plant on property formerly owned by the Stonecrete Corporation at Acmetonia, near Cheswick, Pa. The company contemplates no machinery purchases as the present equipment will be moved to the new site upon completion of the buildings.

The Standard Plate Glass Corporation, First National Bank Building, Pittsburgh, has engaged the J. W. Cruikshank Engineering Co., Arcade Building, engineer, to prepare plans for an addition to its plant at Butler, Pa., to cost $200,000 with equipment. The company has purchased the plants and business of the Watson Paint & Glass Co., 101 Wood Street, for $1,000,000, and will perfect plans for extension and the installation of additional equipment.

The Glen Clay Products Co., St. Marys, Pa., has purchased property at Kersey, Elk County, and will erect a plant for the manufacture of hollow tile products. It will include a power house and is estimated to cost $75,000 with machinery.

The United States Engineer Office, Huntington, W. Va., will take bids until May 2 for one 1½-yd. 2-line clamshell bucket, circular 106; until May 28 for the construction of a power house at dam 32 on the Ohio River.

W. A. James, Kane, Pa., is organizing a company to construct and operate a plate glass manufacturing plant at Durant City, Pa., estimated to cost $1,500,000 including machinery.

Manual training equipment will be installed in the new high school to be erected at Morgantown, W. Va., estimated to cost $600,000, by the Joint Boards of Education of the Morgantown, Cass, Union and Grand School districts. Edward B. Lee, Chamber of Commerce Building, Pittsburgh, is architect.

The Girard Model Works, Girard, Pa., is planning for the purchase of a squaring shear suitable for handling metal up to 18 gage.

The Sharon Railway Supply Co., Sharon, Pa., is being incorporated by Harry Kraft, Joseph H. Jones and Eugenia R. Jones for the purpose of manufacturing and selling railroad supplies. The company will arrange for manufacture by contract for the present.

A manual training department will be installed in the two-story high school to be erected at Sutton, W. Va., estimated to cost $125,000, for which bids are being asked on a general contract. E. J. Wood & Sons, Lownes Building, Clarksburg, W. Va., is architect.

South Atlantic States

BALTIMORE, April 28.

THE Morocco Roofing Co., Rowlandville, Md., recently organized, will erect a new plant, estimated to cost $150,000 with equipment. A power house will be installed. John W. Moore, Rowlandville, heads the company.

D. C. Elphinstone, 408 Continental Building, Baltimore, machinery dealer, has inquiries out for a 16 x 36 in. jaw crusher; a locomotive type boiler, about 50 hp., and two industrial, 36 in. gage, locomotives.

An ice and refrigerating plant will be installed in the six-story addition, 200 x 400 ft., to be erected at the meat-packing plant of the William Schluderberg-T. J. Kurdle Co., East Baltimore Street and Fifth Avenue, Baltimore, estimated to cost $450,000, for which foundations will be laid at once. C. B. Comstock, 110 West Fortieth Street, New York, is architect.

The Greenville Steel & Foundry Co., Greenville, S. C., has engaged J. E. Sirrine & Co., Greenville, architects and engineers, to prepare plans for remodeling and installing machinery in local building recently leased, including the erection of a one-story addition, 30 x 79 ft. Edward McCrady is president and Daniel H. Wallace, Jr., secretary.

The Chief of Engineers, United States Army, Munitions Building, Washington, will take bids until May 8 for 38,000 lb. galvanized wire, advertisement 131.

The Superior Welding & Machine Co., Atlanta, Ga., has leased property at 709 Marietta Street, and will remove its works to this location. Additional equipment will be installed.

The Hackley-Morrison Co., Inc., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a crank shaper, belt-driven, about 20 to 24 in.; motors, 50, 25 and 20 hp.; one 1000 gal. per min. centrifugal pump, motor-driven, to operate under a 100 ft. head, and about 400 ft. 6-in. steel pipe.

The general purchasing agent, Post Office Department, Washington, will take bids until May 5 for 3000 ft. electric cable No. 16; until May 7 for 50,000 ft. armored cable No. 14; 225 speedometers and 25 odometers.

Manual training equipment will be installed in the proposed high school to be erected at Albany, Ga., estimated to cost $200,000, for which Lockwood & Poundstone, Forsythe Building, Atlanta, Ga., are architects.

The Harloe Tire Co., Winchester, Va., has purchased property at Hagerstown, Md., and will erect a new plant to cost $50,000. It is purposed to remove the present busi-

ness from Winchester and install additional equipment. A power house will be erected.

The general purchasing officer, Panama Canal, Washington, will take bids until May 9 for mechanical equipment, including centrifugal pumps, lathe chucks, journal jacks, drawn copper molding, pipe and fittings, screws, valves, door sheaves and track, hammer handles, anchors, water gages and glasses, etc., circular 1606.

The Tomlin-Harris Machinery Co., Cordele, Ga., machinery dealer, is in the market for a used traveling crane, 13 ft. span, with 3-ton triplex block, 10 ft. hoist.

The Common Council, Havre de Grace, Md., is planning the construction of a municipal electric power plant, for which a fund of $300,000 was approved by the recent State Legislature.

Steele's Mill, Rockingham, N. C., will build a new steam-operated power house in connection with extensions in its textile plant, for which plans are being prepared by Robert & Co., Inc., Atlanta, Ga., architect and engineer.

The West Virginia Pulp & Paper Co., 200 Fifth Avenue, New York, is reported to be planning to rebuild the portion of its paper mill at Luke, Md., recently damaged by a heavy storm, with loss estimated at $250,000 including equipment.

The Board of Education, Roanoke Rapids, N. C., is having plans prepared for a three-story industrial school, estimated to cost $125,000, for which bids will soon be asked on a general contract. Northrup & O'Brien, Winston-Salem, N. C., are architects.

The Home Pool Table Corporation, West Point, Va., has acquired a local building and will make improvements for a new works. It will purchase planers, saws, sanders, motors, controls, etc. Scott Broaddus is secretary in charge.

The Oxford Mfg. Co., Oxford, N. C., recently organized with a capital of $50,000, will erect a new plant for the manufacture of automobile license tags and other sheet metal products, to cost $30,000 with equipment. E. G. Hulse is general manager.

Indiana

INDIANAPOLIS, April 28.

THE Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, will soon take bids for a three-story factory branch and distributing works at Pratt and Senate Streets, Indianapolis, 80 x 150 ft., estimated to cost $180,000 including equipment. Hunting & Davis, Century Building, Pittsburgh, are architects.

Ray Weaver, Indianapolis, operating a sheet metal works, has arranged for the removal to larger quarters at 1436 East Tenth Street, where additional equipment will be installed.

The C. & G., Foundry & Pattern Works, Inc., 1026 Kentucky Avenue, Indianapolis, recently organized, is arranging for extensions in its plant and the installation of additional equipment.

The Ohio Valley Roofing Co., Division Street, Evansville, Ind., manufacturer of metal roofing, has preliminary plans for a new three-story factory, 145 x 180 ft., to cost approximately $75,000 with equipment

The Board of Education, Terre Haute, Ind., is having plans prepared for extensions in the vocational school to cost $45,000. Johnson, Miller, Miller & Yeager, 30 North Fifth Street, are architects.

The Indiana Power Co., Vincennes, Ind., is disposing of a bond issue of $700,000, a portion of the fund to be used for extensions in generating plants and system.

The Indiana Electric Corporation, Guarantee Building, Indianapolis, is perfecting plans for a new generating plant at Macksville, Ind., to cost $225,000 with equipment. Stone & Webster, Inc., 147 Milk Street, Boston, is engineer.

Manual training equipment will be installed in the proposed high school to be erected at Batesville, Ind., estimated to cost $85,000, for which plans have been prepared by Karl P. Henkel, Heinemann Building, Connersville, Ind., architect.

Gulf States

BIRMINGHAM, April 28.

THE Birmingham Electric Co., Birmingham, is disposing of a bond issue of $8,000,000, a portion to be used for extensions in power plants and system, and the installation of additional equipment. E. W. Hill is vice-president.

A. J. Herrington, Abilene, Tex., has plans for a one-story automobile service and repair building, 130 x 175 ft., estimated to cost $80,000. A lathe, drill press and bench tools will be purchased. The David S. Castle Co., Abilene, is architect.

W. R. Lamb, Bowie, Tex., and R. G. Pepperell, Lubbock, Tex., have leased a building at Lubbock, and will remodel for a general machine shop and foundry. A department will be installed for the production of cotton-cleaning machinery.

The United States Engineer Office, New Orleans, La., will take bids until May 7, for 45,000 lb. of steel wire nails, and 45,000 lb. of steel wire, proposal 99.

The Bankhead Coal Co., Bankhead, near Jasper, Ala., is considering plans for the construction of a new tipple, with capacity of about 2000 tons per day. Electric power and other equipment will be installed.

The Pan-Tex Pipe Line Co., Amarillo, Tex., is perfecting plans for the construction of a pipe line, with series of pumping plants, estimated to cost $300,000 with equipment. Dorset Carter is president, and W. H. Sparger, secretary. P. T. Lomax, Fort Worth, Tex., is also interested in the company.

Joseph T. Newberger, head of the Newberger Cotton Co., Memphis, Tenn., is perfecting plans for the organization of a company to construct and operate a cotton compress plant in the vicinity of El Paso, Tex., estimated to cost $250,000, including presses, power equipment, etc.

The Lovelace Engineering & Mfg. Co., Oldsmar, Fla., has acquired the plant and business of the Oldsmar Mfg. Co. The present foundry, 80 x 200 ft., will be expanded and a one-story addition erected, 50 x 150 ft., with the installation of an electric furnace for brass and bronze casting production. A testing department will be installed, and a portion of the works arranged for galvanizing and enameling. T. T. Lovelace is president.

A power plant will be constructed at the proposed cotton mill to be located at San Antonio, Tex., by the Planters' & Manufacturers' Cotton Mills Co., recently organized by S. M. Ransopher, head of the Planters' & Merchant's Mills, Inc., New Braunfels, Tex., and associates. The plant is estimated to cost $1,000,000. Similar mills are also proposed at San Marcos and Austin, Tex. Lockwood, Greene & Co., Charlotte, N. C., are engineers.

The Edwards Motor Co., Cleveland Street, Shreveport, La., has plans for a two-story service and repair building, 70 x 150 ft., to cost $50,000 including equipment. E. F. Sporl, Vincent Building, is architect.

The Southern Utilities Co., Bradentown, Fla., is arranging an appropriation of $250,000 for extensions in its electric power plant, including the installation of a 1500-kw. turbo-generator, boilers, oil-burning equipment, and auxiliary apparatus.

The Board of Education, El Paso, Tex., will purchase equipment for a vocational school estimated to cost $170,000.

Pacific Coast

SAN FRANCISCO, April 19.

A bond issue of $12,500,000 is being sold by the Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, a considerable portion of the proceeds to be used for extensions and improvements in hydroelectric power plants and system.

The Guilfoy Cornice Works, North Howard Street, San Francisco, has awarded a general contract to Barrett & Hilp, 918 Harrison Street, for a one-story plant, 50 x 165 ft., on North Howard Street near Eighth Street, to cost about $20,000 including equipment. M. I. Schwartz, Nevada Bank Building, San Francisco, is architect.

The Atchison, Topeka & Santa Fe Railway Co., Los Angeles, has awarded a general contract to Joseph E. Nelson & Son, 3240 South Michigan Avenue, Chicago, Ill., and the Sumner-Sollitt Co., Delta Building, Los Angeles, for the construction of a one-story machine shop at its works at San Bernardino, Cal., for locomotive and car repair service, 180 x 215 ft., to cost approximately $200,000.

The Southern Sierras Power Co., Riverside, Cal., will make extensions in its power plant at Blythe, Cal., including the installation of generator and auxiliary equipment. The company also has plans for a new power house at Levining Creek, Cal., to cost approximately $100,000 with equipment.

The Portland Wire & Iron Works, Portland, Ore., has plans for a one-story addition to its foundry at 294 Second Street. Strong & McNaughton, Corbett Building, are architects.

The Great Western Power Co., 530 Bush Street, San Francisco, has plans under way for extensions and improvements in its hydroelectric power plants and system, to cost in excess of $1,000,000, including the installation of addtiional equipment.

The P. S. Wright Co., 3931 West Sixth Street, Los Angeles, has plans for an eight-story automobile service,

repair and garage building in the West Lake section, to cost $175,000, with equipment.

The Common Council, El Centro, Cal., plans for the installation of electric-operated pumping equipment and filtration machinery in connection with extensions and improvements in the municipal waterworks, to cost $200,000, in which amount bonds are being arranged.

The Magnavox Co., 2725 East Fourteenth Street, Oakland, Cal., manufacturer of radio equipment, has awarded a contract to F. E. Nelson, 3090 King Street, Berkeley, Cal., for a two-story addition to its plant, to cost $55,000. B. J. Cahill, 357 Twelfth Street, Oakland, is architect.

The Anderson Tractor Co., Los Angeles, has awarded a general contract to George Williamson, Lankershim, Cal., for the construction of the first unit of its proposed Lankershim plant on site acquired at Wilcox and Olive Avenues, to cost about $18,000.

The Mechanical Development Corporation, 718 Humboldt Building, San Francisco, recently organized, has completed machine tools specifications, on which its production engineers have been at work in the East for several months, and will prepare to install equipment soon. W. A. Rider heads the engineering department.

Canada

TORONTO, April 28.

WHILE demand for machinery is chiefly for small lots, buyers are fairly numerous and inquiries are improving. The largest list during the week was from the Oxford Foundry & Machine Co., Oxford, N. S., which is ready to purchase equipment for its new machine shop now under construction. Railroad buying is bringing up sales totals, but the past ten days has been confined to one or two tools to an order. Users of equipment are in need of machinery, but in most cases when a new tool is ordered the salesman has to make provision for taking an old tool on account.

Industrial activities have not improved as much as was expected and the recently announced tariff reductions are beginning to have some effect on industry, especially in the agricultural implement field. The automotive industry is buying steadily, but most orders are for replacement purposes. An active demand for small tools, lathes and drills is appearing from garages and automobile repair plants throughout eastern Canada.

The Oxford Foundry & Machine Co., Oxford, N. S., is rebuilding its machine shop which was recently destroyed by fire. It is in the market for one extension lathe, gap lathes, pipe and bolt threading machine to thread pipe 1 to 4 in. in diameter, one cross-cut and seven rip saws, tilting table, handpower crane. H. W. Wood is an officer of the company.

H. Papas, 88 Fort Street, Montreal, is in the market for a tool-room lathe.

B. Corbeau, Nelson Street, Penetanguishene, Ont., is in the market for a tool-room lathe and other equipment for a repair shop.

The Nova Scotia Hardwood Products Co., Amherst, N. S., is erecting a manufacturing plant there and is in the market for complete equipment.

McNeill & Walsh, Essex, Ont., are in the market for complete machinery and equipment for the manufacture of dies and tools and for a general machine shop.

The Centre Garage, Huntsville, Ont., J. E. Mosley, purchasing agent, is in the market for tool room lathe, drill press, air compressor, etc.

The ratepayers of Peterboro, Ont., carried a by-law granting an extension of tax exemptions on the plant of the Canadian General Electric Co., for three years, in retu for which the company will start work immediatel on t erection of an addition to cost $400,000. Machinery tools have not been purchased.

It is reported that the Hydro Electric Commission w invite bids in the early future for the construction of the fifth and sixth units of 12,000 hp., each at the Cameron Falls power development on the Nipigon River, Port Arthur, Ont. These units with Nos. 3 and 4, now under construction, will bring the total of development up to its full estimate of 72,000 hp.

According to a statement by C. W. Kirkpatrick, industrial commissioner, Hamilton, Ont., the Werner G. Smith Co., manufacturer of core oil and foundry supplies, is preparing to establish a manufacturing plant in the city.

McKelvey & Birch, Kingston, Ont., are interested in the purchase of a small machine for rolling light angle iron into hoops.

J. M. Schneider, 145 Queen Street South, Kitchener, Ont., is receiving bids for a $200,000 addition to a packing plant. J. C. Kloehn, 59 Irvin Avenue, is architect.

Town Council of Woodstock, N. B., will install crude oil power plant at a pumping station to cost $20,000.

The McKinnon Industries, St. Catharines, Ont., have awarded a general contract to Newton Brothers, for a $13,000 addition for the manufacture of automobile accessories, carriage hardware, etc.

The Service Truck Co., Wabash, Ind., has purchased a site of 52 acres in Chelsea Green, London, Ont., where it purposes to erect a large manufacturing plant.

The W. T. Rawleigh Co., Freeport, Ill., has secured a site at London, Ont., and intend to start work soon on a manufacturing plant of six floors, 72 x 200 ft.

The Carthage Machine Co., Inc., Carthage, N. Y., has purchased the plant of the J. C. Wilson Mfg. Co., Belleville, Ont., where it will establish a Canadian factory for the manufacture of pulp and paper making machinery.

The Toronto Iron Works has purchased a site at the foot of Saulter Street, Toronto, Ont., where it proposes to erect a manufacturing plant.

Western Canada

The British Columbia Electric Railway Co. is having plans prepared for a $250,000 addition to the Horne Payne substation at Burnaby, B. C. Building will be of steel frame and sheet steel construction and the equipment will include four large main banks of transformers, as well as smaller rotary transformers.

The Consolidated Mining & Smelting Co. plans to spend $1,500,000 on additions and equipment in connection with the smelter at Trail, B. C., within the next eight months. A. N. Skill is Vancouver, B. C., representative.

The machinery and forging shops of Baird, Ltd., Bear Creek, Yukon, were destroyed by fire, April 1, with considerable loss to building and equipment. A large lifting crane was also destroyed by the fire.

The Burrard Shipyard & Engineering Works, Vancouver, B. C., is having plans prepared for a $50,000 plant for construction and repair work. Tools and equipment will be purchased.

Rogers, Brown & Co., Selling Agents

BUFFALO, April 29.—Rogers, Brown & Co., 316 Erie County Bank Building, have been appointed selling agents for the Niagara Falls Smelting & Refining Corporation, which during the year established a plant at Niagara and Albany Streets for the manufacture of aluminum and aluminum alloys. The company began the production of alloys in July of last year at the rate of 3 tons daily and has gradually increased this to 14 tons daily. It is now planned to expand further.

W. R. Hopkins, city manager of Cleveland, is president of the company; Ernest G. Jarvis is vice-president as well as general manager and founder of the company. These two men with Paul Schoellkopf, president of the Niagara Falls Power Co. of Niagara Falls, N. Y., control the company.

STEEL AND INDUSTRIAL STOCKS

The range of prices on active steel and industrial stocks from Monday of last week to Monday of this week was as fol

	Low	High
Chalmers ..	42¾	43⅝
B. S. & Fdy.	107¼	107¼
Can	95⅞	102⅞
Can pf.	111½	111⅞
Am. Car & Fdy..	154¾	157½
Am. C. & F. pf..	121	121
Am. Locomotive.	70⅛	72⅞
Am. Loco. pf....	117	117⅛
Am. Radiator....	94½	98⅝
Am. Steel Fdries	33½	35½
Am. Stl. Fd. pf..	101¼	101¼
Bald. Loco.	108	113½
Beth. Steel	48½	52
Beth. Stl. 7% pf.	93⅝	94¼
Beth. Stl. 8% pf.	107¼	108⅞
Chic. Pneu. Tool	82	83
Colo. Fuel	30¼	35⅝
Crucible Steel ..	51⅛	54¾
Deere pf.	64	65
Gen. Electric ...	204¼	214½
Gt. No. Ore Cert.	27	27½
Gulf States Steel	65⅝	71½
Inland Steel	33¼	34⅞
Int. Har.	83	85
Int. Har. pf. ...	107	107
Jones & L'lin pf.	110	110
Lima Loco.	57⅛	59¾
Nat.-Acme	7⅝	8¼
Nat. En. & Stm..	25½	28
Nat. En. & S. pf.	79	79
N. Y. Air Brake	36⅛	38
Nova Scotia Stl..	8½	9⅛
Otis Steel	7⅞	8½
Otis Steel pf....	52	56¼
Pressed Steel Car	46¼	48¾
Pressed Steel pf.	81¾	81¾
Replogle Steel ..	8¼	9
Republic	44⅝	47¾
Sloss-Sheffield ..	55	57¾
Steel of Canada..	71⅝	74
Un. Alloy Steel..	25	25⅝
U. S. Pipe.....	75¼	90⅜
U. S. Pipe pf....	88¼	88½
U. S. Steel.....	95⅝	101
U. S. Steel pf...	118¾	119½
Vanadium Steel..	22⅜	24⅜
Va. I., C. & Coke	40	45
W'house Air Br..	88½	88¾
Y'gstown S. & T.	63	64

NEW TRADE PUBLICATIONS

Gears.—Boston Gear Works, Norfolk Downs, Quincy, Mass. Catalog No. 44, 1924, follows closely the form of previous yearly catalogs. Dimensions and list prices are given on a wide variety of steel, cast iron, brass, and non-metallic gears, sections being also devoted to sprockets, chain, ball bearings and other transmission equipment. Several pages are devoted to data useful to gear users.

Heavy Stampings.—Federal Pressed Steel Co., Milwaukee. Catalog No. 12, 15 pages, 4 x 9 in. Outlines factors influencing the choice of heavy stampings in place of cast iron parts, presenting in another section the features of the company's service. Illustrations include heavy pressed parts for automotive and other service, the company's disk wheels and bumpers being also described and illustrated.

Convertible Crane and Shovel.—McMyler-Interstate Co., Bedford, Ohio. Bulletin No. 59, 32 pages, 8½ x 11 in., devoted to the No. 2 convertible crane and shovel. The hoisting mechanism includes two power drums and a boom hoist. The machine may be driven by steam or gas engine or electric motor, and may be mounted on a stationary base, crawler treads, tractor wheels, or railroad or ditcher carbody. Various types of buckets may be used as well as lifting magnets and drop hammers. The machine may be converted into a steam shovel. The mechanism is described in detail and the several uses of the machine are described and illustrated. Several illustrations are in color, and detail views are unusually clear. The type is large, titles and subtitles are in color, and the makeup unusually attractive.

Steel Lockers, Cabinets and Shelving.—Lyon Metallic Mfg. Co., Aurora, Ill. General catalog, made up of several bulletins, size 8½ x 11 in. Bulletin 209B, 24 pages, gives details of the various types and proper installation of steel lockers. Standard shelving for tool rooms, store rooms and plant equipment as described in bulletin No. 104A, of 17 pages, steel shelf boxes for use with the shelving being treated of in another bulletin. Bulletin No. 105 is devoted to tool room equipment. Other catalogs include storage and wardrobe types of steel cabinets, commercial type steel shelving and steel tire racks. Illustrations are numerous and dimensions and construction details are given.

Automatic Machines.—Baird Machine Co., Bridgeport. Circular giving data on six-spindle horizontal chucking machine, wire forming machines and tumbling barrels.

Portable Cylinder Grinder.—Gisholt Machine Co., Madison, Wis. Group of circulars describing the Du-All portable cylinder grinder and piston fitting machine, intended primarily for garages and repair shops. The method of using the machine is fully illustrated.

Economy Manual.—Economy Pumping Machinery Co., Chicago. Thirty-six page catalog of electric and power-driven pumping machinery for use in connection with heating, ventilating and building service. Tables of sizes and of engineering data are given, along with illustrations and descriptions of a variety of equipment covered under the general head.

Internal and Link Grinder.—Gisholt Machine Co., Madison, Wis. Seven-page leaflet featuring the company's internal and link grinder for railroads. The link grinding attachment will grind arcs from 3 to 8 ft., radius, and up to 30 in. in length.

Counting Devices.—Root Co., Bristol, Conn. Bu[illegible]t under the title of "Formula of Facts, Figures and Fact[illegible]p. ties for Finding Faulty Figures in Production Cos[illegible]est outlines the use of automatic counters in a variety [illegible]re applications.

Direct Current Transformer.—Gisholt Machine Co., Madison, Wis. Circulars describing device for securing d. c. low-voltage from commercial lighting circuits. The device is intended to replace batteries and motor generators for operating low voltage d. c. devices such as sprinkler systems, alarm systems, elevator signals, etc. The device is fully described and illustrated and its applications in various service outlined.

Calendar.—Heine Boiler Co., St. Louis. Attractive poster in colors, 13½ x 23 in., and having three calendars printed in black on white. One of the calendars is large and is for the current month, the two smaller calendars showing the past and coming month, respectively.

Power Plant Lubrication.—Tide Water Oil Sales Corporation, 11 Broadway, New York. Sixty-page publication devoted to the lubrication of bearings and other surfaces. The book takes up a discussion of the basic principles of lubrication as applied to prime movers and auxiliary machinery in the power field. There are forty illustrations, while two pages of index permit any topic to be consulted quickly. Different types of lubricators are outlined, the main feature of the lubrication elements being shown in color in the diagrams. Internal combustion engines are given particular attention, while motors and other moving elements are treated.

Dry Vacuum and Pressure Pumps.—Lammert & Mann Co., 215 North Wood Street, Chicago. Booklet illustrative and descriptive of different types of Lammert pumps, which may be had for any type of power drive. Lammert pressure pumps are used for agitating liquids, spraying, positive blowing for machine shops and any other service where pressure up to 25 lb. can be used. They operate on the rotary principle.

Balancing Machines.—Gisholt Machine Co., Madison, Wis. Group of circulars dealing with the company's precision balancing machine for the accurate measuring and location of unbalance in flywheels, crankshafts and other rotative parts. The machine gives static and dynamic balance simultaneously. Rapid operation is a feature.

Diesel Engines for Standby Service.—Busch-Sulzer Brothers Diesel Engine Co., St. Louis. Four-page reprint of an article dealing with the use of internal combustion engines as spares in steam and hydro-electric plants. Their advantages for this purpose include readiness to deliver full output without incurring standby fuel losses, a low fuel cost, ease in governing which permits quick cooperation with other machines, self-contained operation independent of main plant equipment, etc. Data are given showing the use of machines in this manner and giving figures for cost of operation and other operating details.

Refractory Sand.—Quigley Furnace Specialties Co., 26 Cortlandt Street, New York. Small folder of 16 pages describing "Ganisand," a highly refractory ganister for lining and repairing industrial furnaces and making refractory tile and special shapes.

Monel and Nickel Castings.—Wm. J. Sweet Foundry Co., Inc., York and Almond Streets, Philadelphia. Folder describing a line of castings of monel and nickel for use in special machinery for dyeing and chemical plants.

Furnaces.—F. A. Coleman Co., Cleveland. Folder describing aluminum furnaces with cast iron pots, stationary or tilting, for melting. A special pouring lip is a feature.

Automatic Temperature Control.—F. J. Ryan & Co., Wesley Building, Philadelphia. Eight-page bulletin dealing with a system of temperature control in using oil or gas for fuel. This control is a valve group operating in conjunction with a solenoid and with its movement impulse originating in a thermocouple in the heating chamber. Safeguards are provided for contingencies in operation, while the valve control may be arranged in single or multiple sets, according to the method of operation desired.

Domestic Oil Heating.—Nufuel Burner Co., Erie, Pa. Folder describing a gravity feed oil burner installation for use with domestic heating appliances. Manual control is had by hand regulator in the living quarters. The device is available in three sizes.

Tubular Feed-Water Heaters.—Sims Co., Erie, Pa. Folder illustrating several styles of water heaters using either direct heat or waste heat. Both vertical and horizontal types are shown.

Static Condensers for Power Factor Correction.—[illegible]stinghouse Electric & Mfg. Co. Circular No. 1670, [illegible]pages. The need for power factor correction and [illegible]methods of obtaining high power factor are dis[illegible]d. The selecting of the proper corrective device [illegible]power factor is analyzed, and the fields of application of synchronous and static condensers set forth in diagrammatic form. The method of calculating the corrective kva. necessary for an installation of condensers and a chart for determining the percent of reactive kva. required to raise the power factor to a desired value are presented. A tabulation of the weights, dimensions and losses of static condensers and the weights and dimensions of transformers also is given.

Gas Machines.—Tirrill Gas Machine Lighting Co. New circular presents in a simple and direct manner the details of operation of a gas machine, designed specially for service in homes, laboratories and factories.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates

	Per Lb.
Bars:	
Refined iron bars, base price	3.49c.
Swedish charcoal iron bars, base	7.00c.
Soft steel bars, base price	3.49c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.59c.
Channels, angles and tees under 3 in. x ¼ in., base	3.49c.
Steel plates, ¼ in. and heavier	3.59c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.55c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.05c.
Toe-calk, ½ x ⅝ in. and larger	4.50c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c.
Squares, flats and hex	4.90c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High-speed steel, 18 per cent tungsten	70c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.34c.
No. 12	4.39c.
No. 14	4.44c.
No. 16	4.54c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.55c. to 4.70c.	.....
Nos. 22 and 24	4.70c. to 4.85c.	5.10c.
No. 26	4.75c. to 4.90c.	5.15c.
No. 28*	4.85c. to 5.00c.	5.25c.
No 30	5.05c. to 5.20c.	.....

Galvanized

	Per Lb.
No. 14	4.95c. to 5.10c.
No. 16	5.10c. to 5.25c.
Nos. 18 and 20	5.25c. to 5.40c.
Nos. 22 and 24	5.40c. to 5.55c.
No. 26	5.55c. to 5.70c.
No. 28*	5.85c. to 6.00c.
No. 30	6.35c. to 6.50c.

*No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—41	—24	⅛ in. Butt	— 4	+19
¼ in. Butt	—46	—32	¼ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt.	—14	+ 6
2½-6 in. Lap.	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap.	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap	— 3	+16

Bolts and Screws

Machine bolts, cut thread,
45 and 10 to 45, 10 and 10 per cent off list
Carriage bolts, cut thread,
35 and 10 to 35, 10 and 10 per cent off list
Coach screws, 45 and 10 to 45, 10 and 10 per cent off list
Wood screws, flat head iron,
75, 20 and 10 per cent off list

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.25c. to 4.50c.
Annealed soft	4.50c. to 4.75c.
Galvanized annealed	5.15c. to 5.40c.
Coppered basic	5.15c. to 5.40c.
Tinned soft Bessemer	6.15c. to 6.40c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¾c. to 18¾c.
High brass wire	18¼c. to 19¼c.
Brass rods	15½c. to 16½c.
Brass tube, brazed	25¾c. to 26¾c.
Brass tube, seamless	21½c. to 22½c.
Copper tube, seamless	22¾c. to 23¾c.

Copper Sheets

Sheet copper, hot rolled, 21¼c. to 21¾c. per lb. base.
Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20
IC	$11.75	$9.50
IX	13.25	11.50
IXX	14.50	12.50
IXXX	15.50	13.75
IXXXX	16.50	14.75

Coke—14 x 20	Prime	Seconds
80 lb.	$6.55	$6.30
90 lb.	6.65	6.40
100 lb.	6.75	6.50
IC	7.00	6.75
IX	8.25	8.00
IXX	9.50	9.25
IXXX	10.75	10.50
IXXXX	12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	54c.
Bar	55c. to 60c.

Copper

Lake ingot	16 c.
Electrolytic	15½c.
Casting	14½c.

Spelter and Sheet Zinc

Western spelter	8c.
Sheet zinc, No. 9 base, casks	10¾c. open 11½c.

Lead and Solder*

American pig lead	9¼c. to 9½c.
Bar lead	13c. to 14c.
Solder ½ and ½ guaranteed	40c.
No. 1 solder	38c.
Refined solder	34c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	12c. to 13c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	36c.

Old Metals

Business is sluggish due to the uncertain movement of new metals. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	11.25
Copper, heavy wire	10.75
Copper, light bottoms	9.00
Brass, heavy	6.50
Brass, light	5.00
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.75
No. 1 red brass or composition turnings	8.00
Lead, heavy	6.25
Lead, tea	4.75
Zinc	4.00
Cast aluminum	15.00
Sheet aluminum	15.50